

Metso Wear lining and sheeting

Handbook

Version 1.2





Metso wear lining and sheeting

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Screening and Conveyor Solutions

Working together

for you



Metso is a global supplier of sustainable technology and services for mining, construction and oil & gas industries.

As a **full-service partner** to these industries, Metso relies on a global pool of about 20,000 dedicated employees to help our customers achieve successful results in every part of their operation.

Metso wear lining solutions reflect that commitment in every product and service we offer. Working closely with our customers, **we go beyond simply being a supplier** to consulting on and recommending genuinely customized solutions that help maximize productivity and profit for them. That's how we live up to the Metso promise: **Expect results**. By investing in understanding the customer's business at every level, we become a true partner in helping them achieve all that is possible from every production site, wherever it is and whatever the challenges.

Your partner in maximum productivity

Metso wear lining solutions have always been known for the quality of their construction, their dependability in the field and their ongoing innovation to find more productive lining options. Customers and non-customers alike often turn to us for information and recommendations on all aspects of wear lining.

Today, Metso represent a flexible and reliable partnership in maximizing mining and construction site productivity. It goes beyond production, supply delivery and stockage of products. We advise on configuration. We proactively analyze all components of your operation to ensure that the wear lining solution maximizes production and minimizes downtime.

At the same time, we continue developing wear lining materials and construction in our ongoing quest to always offer our customers more productive options matched to their exact needs. Partnering with Metso means having more options from the widest range of dependable wear lining solutions from a single source. Real-time access to production - enhancing developments as they become available. And the peace of mind of continuous support from a partner whose definition of success is **how well we contribute to yours**.



Production and material technology

As developments in materials technology continues to grow, so does Metso innovation in applying them to wear linings. Steel is still today the most widely used lining material. But we believe that the best results for today's mining and construction operations are achieved by combining materials such as steel, rubber/polyurethane and ceramics – and taking full advantage of the best features of each. Compared to steel wear plates, for instance, synthetic wear linings offer outstanding wear life and noise reduction, resulting in lower costs and a better working environment at your site.



Lower costs It's no secret that an easy way to increase profits is to lower unnecessary costs; starting with wear on equipment and the downtime it leads to.

For more than 40 years, Metso wear-resistant rubber and polyurethane products have demonstrated cost reductions in almost every tried application. Due to their high elasticity and impact absorption, rubber and polyurethane can withstand high crushing stresses without damage. Metso products also come in wear-resistant designs and are backed by our application know-how. Which lets you minimize the effects of general wear, lowering replacement expenses and minimizing costly downtime.



State of the art manufacturing

Maintaining the highest possible profit per tonne is important to our customers. And our customers are important to us.

That is why we invest heavily in the most advanced manufacturing techniques available. Polyurethane castings are made with a computerized and fully automatic carousel technique and an advanced injection-pressing method is used for TPU materials. Computerized injection presses are used in rubber manufacturing. On conventional presses, rubber and steel support plates are bonded together with a special adhesive at high pressure, ensuring proper adhesion. The result is product quality you can count on – and profit from.

Lean manufacturing – The Metso Way

Lean manufacturing makes good business sense for everyone.

The Metso Way is a collection of management systems implemented throughout the company. It is based on a number of key principles: do things right the first time, have operational stability, standardize work, be committed, deliver just in time and work continuous towards improvement. Third party assessed systems as SS-EN ISO 9001:2000 Quality Management, SS-EN ISO 14001 Environment and OHSAS 18001 Working Environment are the foundations on which we are building the Metso way.

Wear protection solutions you can count on

Mining, aggregate and cement screening is tough on equipment, which can make it even tougher on budgets. Keep material flow up and maintenance time down with a range of wear protection products designed to maximize productivity and profit.

Installed in chutes, spouts, hoppers and transfer points, Metso wear lining products minimize wear and reduce noise while increasing service life. The wear lining offering includes a wide range of products designed to best support customer needs in keeping the total cost per tonne down.

To utilize the product benefits for specific areas and applications, new concepts have been developed to an offering including a comprehensive package with tools, market offer, material and support.



Trellex Poly-Cer The hard ceramic surfaces provide unsurpassable wear resistance while the elasticity of the rubber absorbs the impact of blows. Poly-Cer is used in many quarry and mining applications, particularly where abrasion is high and the angle of impact of material against the plates is small.



Trellex SQ Trellex SQ 300 module system brings together three different types of material (RU, PU, a combination of PU and ceramics) to maximize flexibility and wear protection. Provides excellent wear protection for feeders, bins, chutes, silos and other applications that are subject to wear and noise.



Trellex Wear Elements Trellex Wear Elements includes a wide range of basic wear plates manufactured in rubber or polyurethane. The wear elements provide first class wear protection in applications such as chutes, truck beds, feeders, silos and other applications that are subject to wear and noise. Manage high-impact as well as sliding wear.



Trellex LF Trellex LF plates minimize surface friction to prevent material from sticking. Excellent solution for bins, chutes, silos and other low wear applications. Suitable for applications that require extremely low friction.

Wear Lining Solutions Metso offers several wear lining solutions especially developed to fit specific applications like truck beds, washing drums, concrete mixers and screen feed boxes. The solutions are developed to meet all your needs in terms of keeping material flow up and maintenance time down.

Sheeting Trellex wear sheeting has proved a long wear life in comparison with other wear materials like steel. Fewer stops and less production losses increase your profitability. Depending on application you can choose from rubber or polyurethane wear sheeting.



Lining system - overview

Selection guide

The selection guide for lining solutions is divided into three sections: wear improvements, flow improvements and noise reduction. Pick your critical areas for improvement and let the selection guide help you find the product that brings the most value to your application.

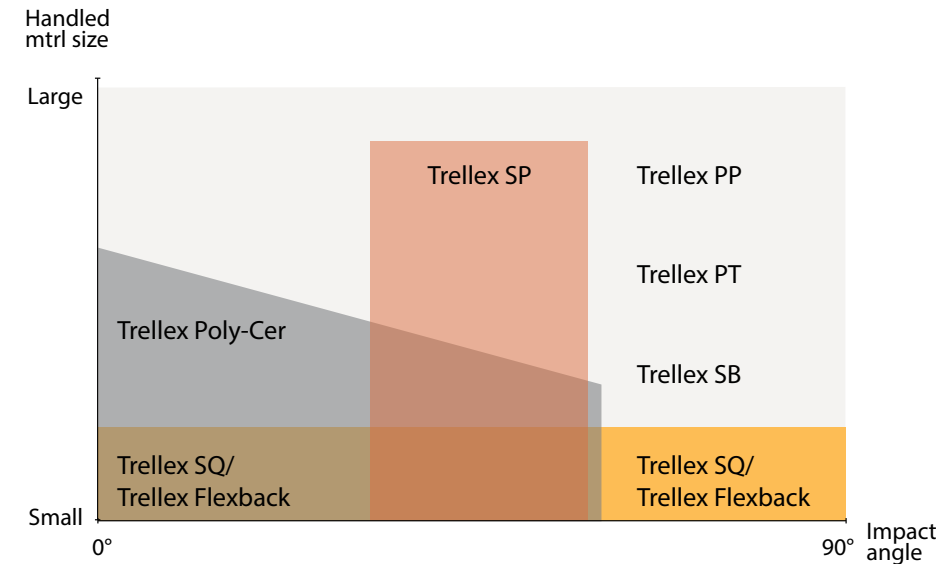
Your choice will be based on processing conditions, material size, shape, drop height, volume, angle of impact, etc.

Find out more about the products and selection guides in each product section.

A General wear improvement lining guide

Improve wear life of lining applications with Metso lining products. We offer a wide range of various lining products suitable for any application – wet or dry application, small or large material size and different impact angles.

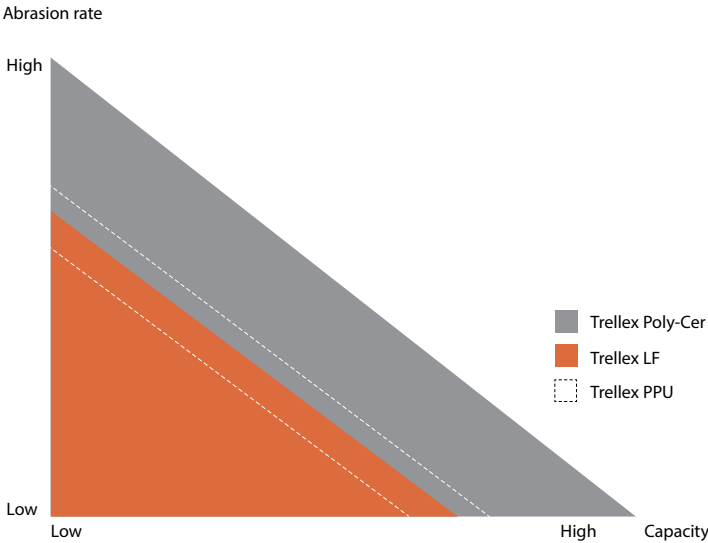
Below you find an overview of products for various applications. Some products overlap and can be used in the same application.



B General flow improvement lining guide

Lining products for flow improvement are available in a range of options, based on high wear and capacity.

Below you will find an overview of products for various areas of use. Some products overlap and can be used in various applications.



C General noise-reduction lining guide

Excessive noise is a problem in mining and construction operations. Managing noise pollution is more important than ever. All wear rubber products such as Trellex PP, Trellex SP, Trellex PT, Trellex SB, Trellex WB, Trellex SQ, Trellex Flexback and Trellex Poly-Cer will contribute to reducing noise levels by up to 20 decibel. Reducing the noise by 10 decibel corresponds to the effect of cutting the noise by half. Less noise means better work conditions.

Diagram sound level - Loading truck

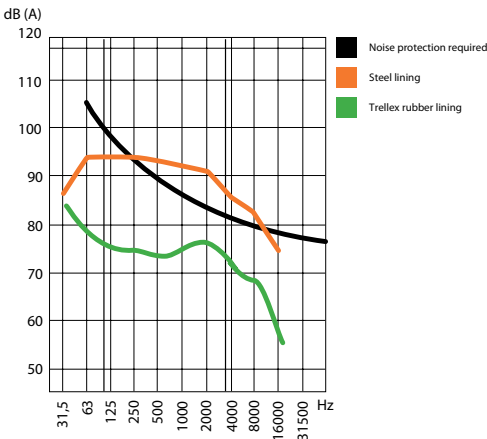
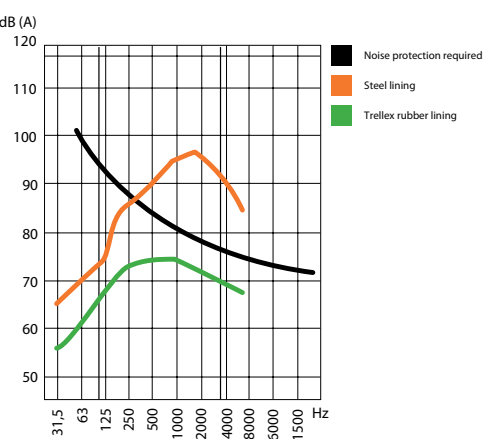


Diagram sound level - Primary chute



D Environmental effects on Lining products

Water
RU components

(recommendations valid for handled material temperature up to 30° C (86° F)

pH-range	Comment
pH 2 – 13	No effect on RU
pH 2 – 4	Stainless steel recommended for metal parts exposed to handled material
pH 4 – 9	No effect on steel or aluminium parts exposed to handled material
pH 9 – 11	Some effects on aluminium parts. For long wear life we recommend steel parts
pH 11 – 13	Steel parts recommended for metal parts exposed to handled material

PU components

pH-range	Comment
pH 2 – 13	No effect on PU standard quality
	Stainless steel / aluminium / steel parts same recommendation as rubber components

Temperatures

RU components

Temperature range	Comment
- 25 / + 70°C (-13 / + 158° F)	No effect on RU
70 - 120° C (158 - 248° F)	Not recommended, ask Productline specialist
- 60 / - 25° C (- 76 / - 13° F)	Ask Productline specialist

PU components

Temperature range	Comment
- 25 / + 70°C (--)	No effect on PU



Chemicals
RU components

PU components

Resists smaller concentrations of sodium, salts, calcium and glycerine. Good resistance to nitrogen, mineral oil, carbon dioxide, carbon monoxide and ASTM oil 1 - 3.

Storage

RU & PU components must be protected from sun light, excessive heat and ozone. Avoid deformation of rubber & PU components when stacked and stored. Indoor storage is recommended when storing rubber & PU components for longer periods of time. (6 months or more).

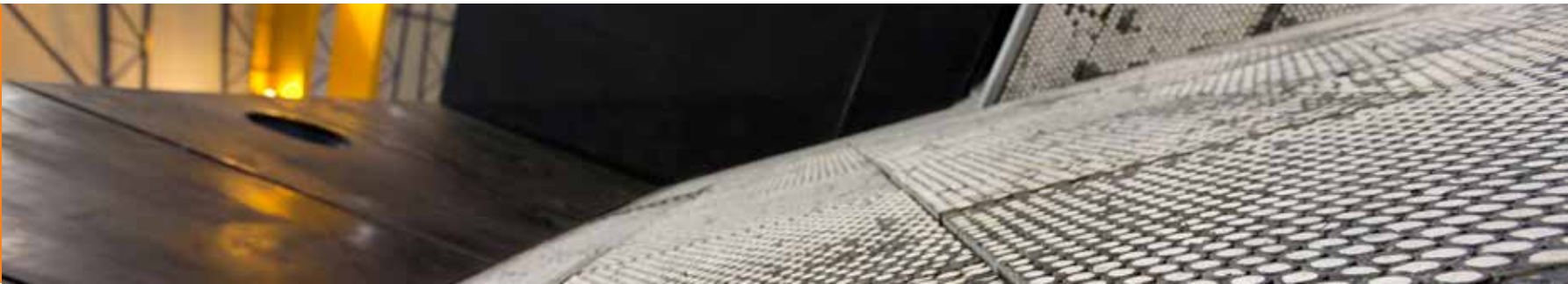
Storage of rubber sheeting without CL

Max. 24 months
uAt 25 °C ± 2 °C with no loss in quality.
Subject to DIN regulation 7716.

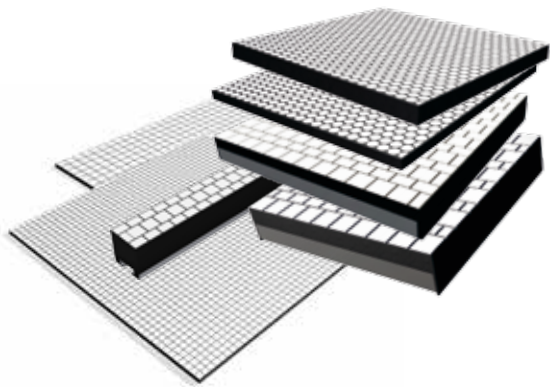
Trellex LF

Please see all data under the product page.

Trellex Poly-Cer



Trellex Poly-Cer is designed to be extremely resistant to abrasion even in high material flows and speeds. The unique design of ceramic inserts improves wear life and impact resistance.



Trellex Poly-Cer 10S, 20S, 38S and 70S are engineered using T60 wear rubber with built-in ceramics and enhanced with fixed hot-vulcanized steel reinforcement. Poly-Cer 4S is engineered using wear rubber with built-in ceramics hot-vulcanized together and combined with a contact layer. Excellent wear resistance in applications with sliding wear and high material speeds, particularly where the material has only a slight impact angle. Poly-Cer WB 100/38S is designed with built in ceramics into wear rubber at the top of

the bar and at the bottom part an hot-vulcanized aluminium track for the T-bolt fastening system. Different fixing methods alternative guarantee secure fixing. Poly-Cer also reduces noise and vibration.

Application areas

Poly-Cer provides excellent wear protection for feeders, bins, transfer chutes, silos, transfer points and any other applications that are subject to heavy wear and noise. Poly-Cer is ideal for medium-heavy rock and gravel

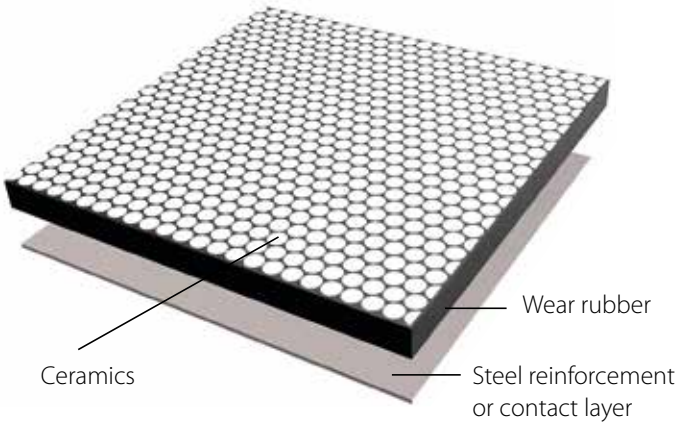
industry, or for secondary and lighter applications. Poly-Cer 4S is optimized for medium to light mining, rock and gravel industries with lighter applications.

Technical description

Resists pH values 4-9 and all water types, also most oils and chemicals in moderate/small concentrations.

Other information

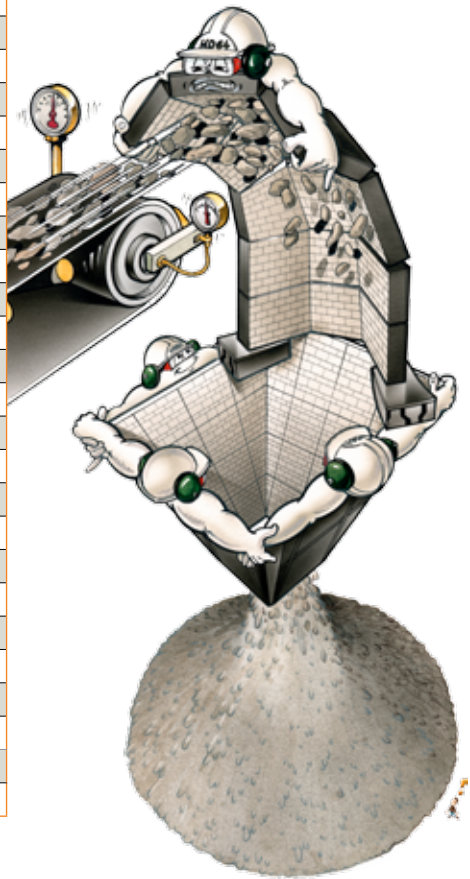
Trellex Poly-Cer is most effective in the temperature range -30°/+70°C.



Trellex Poly-Cer standard range

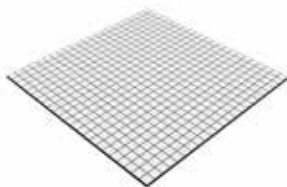
Part No.	Description	Thickness x Width x Length (mm)	Weight (kg/ea)
1017803	Trellex Poly-Cer 4S 8/0	8x500x500 (tiles 10x10x4)	4.7 kg
1017804	Trellex Poly-Cer 4S 8/0	8x500x500 (tiles 20x20x4)	4.7 kg
6650517	Trellex Poly-Cer 10S 20/5	20x200x400	5.8 kg
6650518	Trellex Poly-Cer 10S 20/5	20x400x400	11.6 kg
6660301	Trellex Poly-Cer 10S 20/5	20x500x250	8.6 kg
6660300	Trellex Poly-Cer 10S 20/5	20x500x500	17.3 kg
6650519	Trellex Poly-Cer 20S 35/5	35x200x400	8.3 kg
MM0407488	Trellex Poly-Cer 20S 35/5	35x229x457 (9"x18")	11 kg
ZX11333210	Trellex Poly-Cer 20S 35/5	35x300x300	9.6 kg
442502.3	Trellex Poly-Cer 20S 35/5	35x305x305	10 kg
MM0407486	Trellex Poly-Cer 20S 35/5	35x305x610	19.9 kg
6650520	Trellex Poly-Cer 20S 35/5	35x400x400	16.6 kg
6660247	Trellex Poly-Cer 20S 35/5	35x500x200	10.7 kg
2939790	Trellex Poly-Cer 20S 35/5	35x500x250	13 kg
6610096	Trellex Poly-Cer 20S 35/5	35x500x300	16 kg
2939780	Trellex Poly-Cer 20S 35/5	35x500x500	26.7 kg
6650522	Trellex Poly-Cer 38S 64/5	64x200x400	14 kg
MM0407628	Trellex Poly-Cer 38S 64/5	64x229x457 (9"x18")	23 kg
6610558	Trellex Poly-Cer 38S 64/5	64x244x502	22 kg
6610557	Trellex Poly-Cer 38S 64/5	64x262x502	24 kg
6620390	Trellex Poly-Cer 38S 64/5	64x302x304	16.5 kg
MM0407626	Trellex Poly-Cer 38S 64/5	64x305x305	20.5 kg
MM0407627	Trellex Poly-Cer 38S 64/5	64x305x610	40.9 kg
6650521	Trellex Poly-Cer 38S 64/5	64x400x400	29 kg
6620273	Trellex Poly-Cer 38S 64/5	64x500x502	55 kg
6650524	Trellex Poly-Cer 70S 95/5	95x200x400	22.1 kg
6620347	Trellex Poly-Cer 70S 95/5	95x250x500	35.5 kg
6650523	Trellex Poly-Cer 70S 95/5	95x400x400	44.6 kg
6620346	Trellex Poly-Cer 70S 95/5	95x500x500	71 kg
MM0372088	Trellex Poly-Cer WB 100/38S	100x100x1500	27 kg
6620346	Trellex Poly-Cer 70S 95/5	95x500x500	71 kg

Custom-made dimensions upon request.



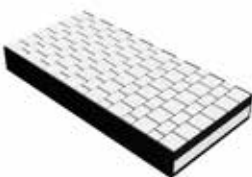
Trellex Poly-Cer - installation

Product range



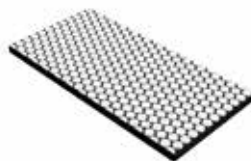
Trellex Poly-Cer 4 S 8/0

Poly-Cer 4 S is engineered using wear rubber with built-in ceramics hot-vulcanized together and combined with a contact layer. Excellent wear resistance in applications with sliding wear and high material speeds, particularly where the material has only a slight impact angle. Poly-Cer 4 S is optimized for medium to light mining, rock and gravel industries with lighter applications.



Trellex Poly-Cer 38 S 64/5

The unique design shape of the ceramic elements and its zigzag pattern provides for tougher applications with large material, high volume flows and angled impact. Patent pending.



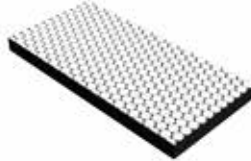
Trellex Poly-Cer 10 S 20/5

Excellent wear protection for tough conditions with low angles of impact and high material flows. Trellex Poly-Cer Slim is the thin alternative for applications with limited lining thickness and weights. Typical applications are feeders, chutes and transfer points in conveyor systems.



Trellex Poly-Cer 70 S 95/5

An even more heavy-duty version of 38 S 64/5, with a similar unique design ceramic element in a zigzag pattern, the 70 S 95/5 tackles the extreme of material, volumes and angles. The solution to the toughest of wear problems. Patent pending.



Trellex Poly-Cer 20 S 35/5

The Nestor in the Poly-Cer family, with more than 15 years behind it, is an all-round wear plate with a wide range of applications. Offers excellent results when used with large volumes and high material velocities. Typical applications are chutes and transfer points in conveyor systems, as well as material deflectors and screening chutes.



Trellex Poly-Cer WB

The bar alternative, 100 mm wide and 100 mm high with built-in track in the bottom for T-bolt fastening, top with ceramics same as Poly-Cer 38S.

Trellex Poly-Cer - installation

Fixing methods

Trellex Poly-Cer 4S

Preparation of the metal surface

- 1 The metal surface must be free from rust, dirt and other deposits. The best way is to sandblast the area other way is to use a grinder.
- 2 Degrease the metal surface with a solvent.
- 3 Brush on a thin layer of Trellex Steel Primer P5. The normal drying time for a P5 layer is at least 30 min.
- 3 Brush the first layer of glue on to the contact layer surface and let it dry for at least 30 minutes.
- 4 Brush the second layer of the glue onto the metal surface.
- 5 Brush the second layer of the glue on to the contact layer surface.

Glueing steps

- 1 Brush the first layer of glue on to the steelprimed metal surface and let it dry for at least 30 minutes
- 2 Fresh up the contact layer with a solvent. Let it dry.

- 6 When both surfaces are sticky, put them together; the glue layers must be sticky and not leave any black traces. Back of the hand test.
- 7 Ensure that any air bubbles and creases are eliminated. Use a roller and a recoil-free hammer. Start in the middle and work out to the edges.

NOTE! The maximum glue strength is achieved after 24 hours.

NOTE! Do not put the material together too soon, as there is a risk that the layers will not achieve full contact strength.

More info

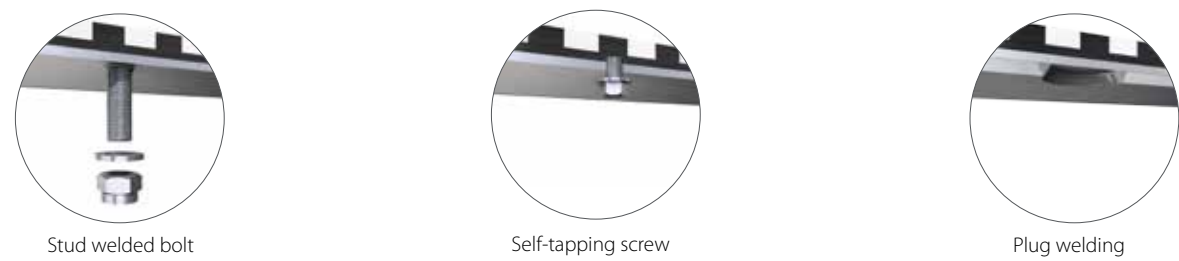
Trellex Adhesives Steel primer P5 part No. 2322060, consumption guideline 0.15 kg/m²/layer

Trellex Adhesives T2, part No. 2322010, consumption guideline 0.35 kg/m²/layer

Trellex Poly-Cer - installation

Fixing methods

Trellex Poly-Cer 10S, 20S, 38S and 70S



Stud welding standard fixing sets

Wet applications	Part No.	Dry applications	Part No.	Recommended stud bolts	Poly-Cer 10S	Poly-Cer 20S	Poly-Cer 38S	Poly-Cer 70S	Recommended torque (Nm)
M12 Stud bolt M12x50 Rubber sealing 40/12-12 Cup washer 40/15-11 Nut M12 nyloc	MM0371834	M12 Stud bolt M12x40 Washer 2x13/24 Nut M12 nyloc	MM0371833	M12 (1/2")	Standard	Option			40
M16 Stud bolt M16x50 Rubber sealing 40/16-12 Cup washer 40/18-11 Nut M16 nyloc	MM0371837	M16 Stud bolt M16x45 Washer 3x17/30 Nut M16 nyloc	MM0371836	M16 (5/8")	Option	Standard	Option		110
M20 Stud bolt M20x50 Rubber sealing 60/19-12 Cup washer 60/21-12 Nut M20 nyloc	MM0371839	M20 Stud bolt M20x45 Washer 3x21/36 Nut M20 nyloc	MM0371838	M20 (3/4")		Option	Standard	Standard	220

Standard fixing sets for Poly-Cer WB 100/38S

Dry applications		
Part. No	Description	Weight (kg/ea)
2934210	Trellex T-bolt 35/55 M16x70/55	0.22
212803	Washer 3x17/30	0.012
315150	Nut M16 nyloc	0.035

Wet applications		
Part. No	Description	Weight (kg/ea)
2934210	Trellex T-bolt 35/55 M16x70/55	0.22
ML-248001	Rubber sealing 40/16-12	0.02
ML-200014	Cup washer 40/18-11	0.1
315150	Nut M16 nyloc	0.035



Trellex Poly-Cer - installation

Bending radious

Trellex Poly-Cer 4S

Type of Poly-Cer	Inner radius (mm)	Outer radius (mm)
4S tile 10x10	50	50*
4S tile 20x20	100	100*

* Not standard design, to be used in exceptional cases, ask productline specialist.



Trellex Poly-Cer 10S, 20S, 38S and 70S

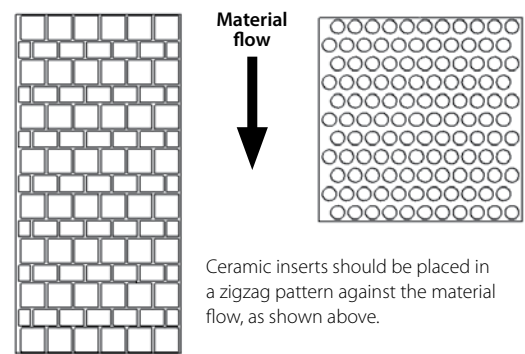
Type of Poly-Cer	Inner radius (mm)	Outer radius (mm)*
10S (Slim)	250	350*
20S (Classic)	250	350*
38S (HD64)	Non standard**	Not applicable
70S (HD95)	Non standard**	Not applicable

* Not standard design, to be used in exceptional cases, ask productline specialist.
** Available for limited radious and with special reinforcement design, ask productline specialist.



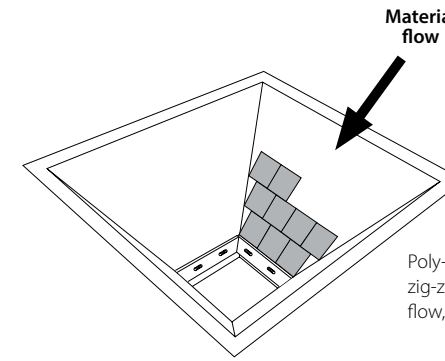
Trellex SQ 300 - installation

Installation guideline



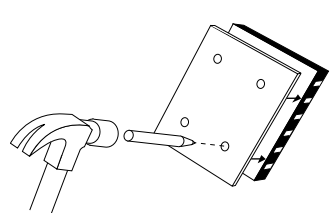
Material flow

Ceramic inserts should be placed in a zigzag pattern against the material flow, as shown above.

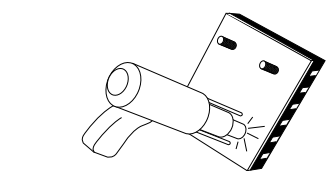


Material flow

Poly-Cer plates should be placed in a zig-zag pattern against the material flow, as shown above.



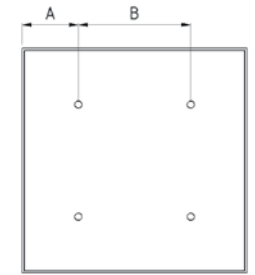
1 Knock a centre punch in the centre of the markings.



2 Grind/clean around the markings, remove all rust etc. Do not grind away the punch markings.

3 Permanently weld the studs using stud welding equipment.

More info



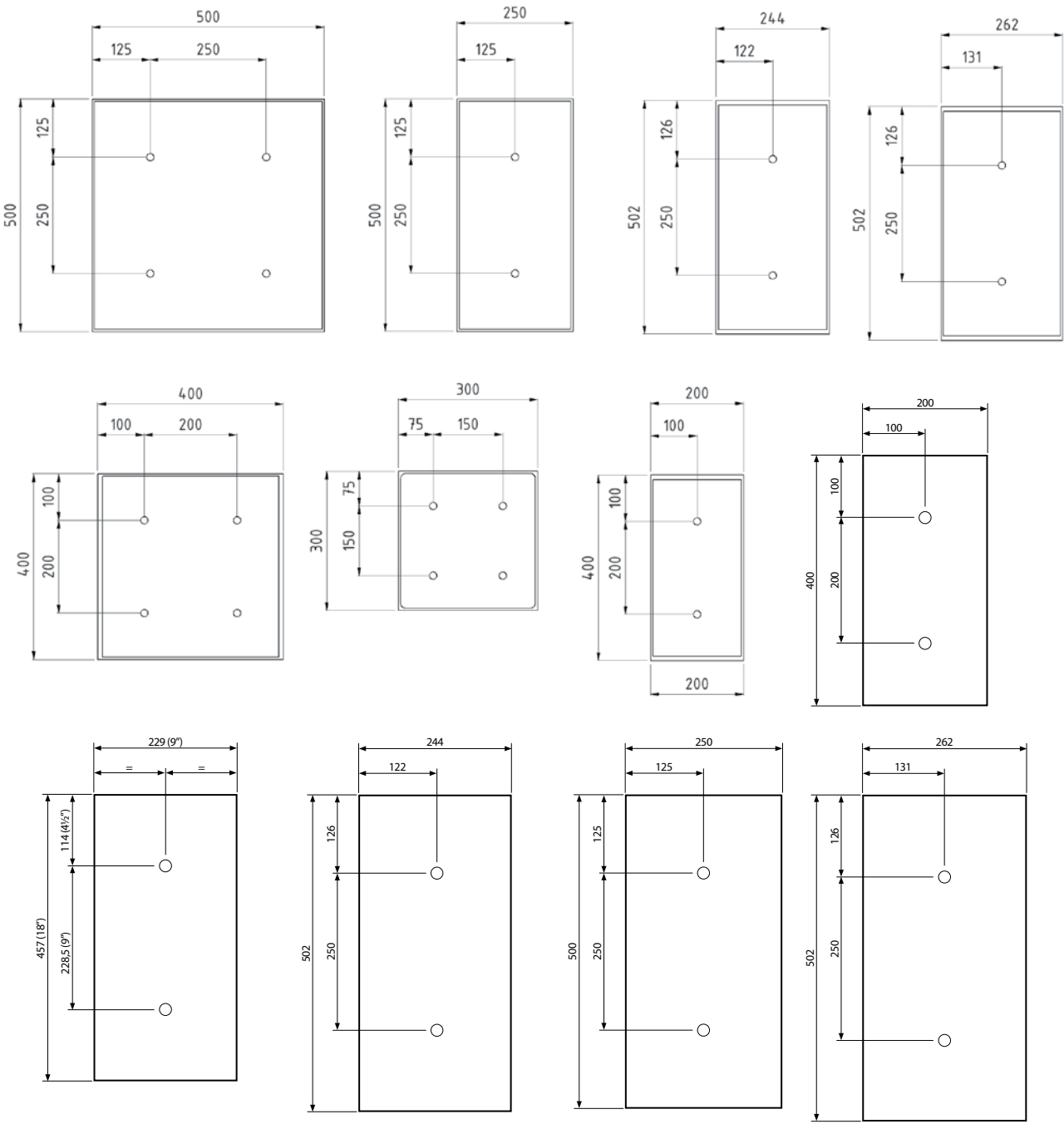
Customized fastening pattern limits

Measurement	Min (mm)	Max (mm)
A	50	150
B	50	300

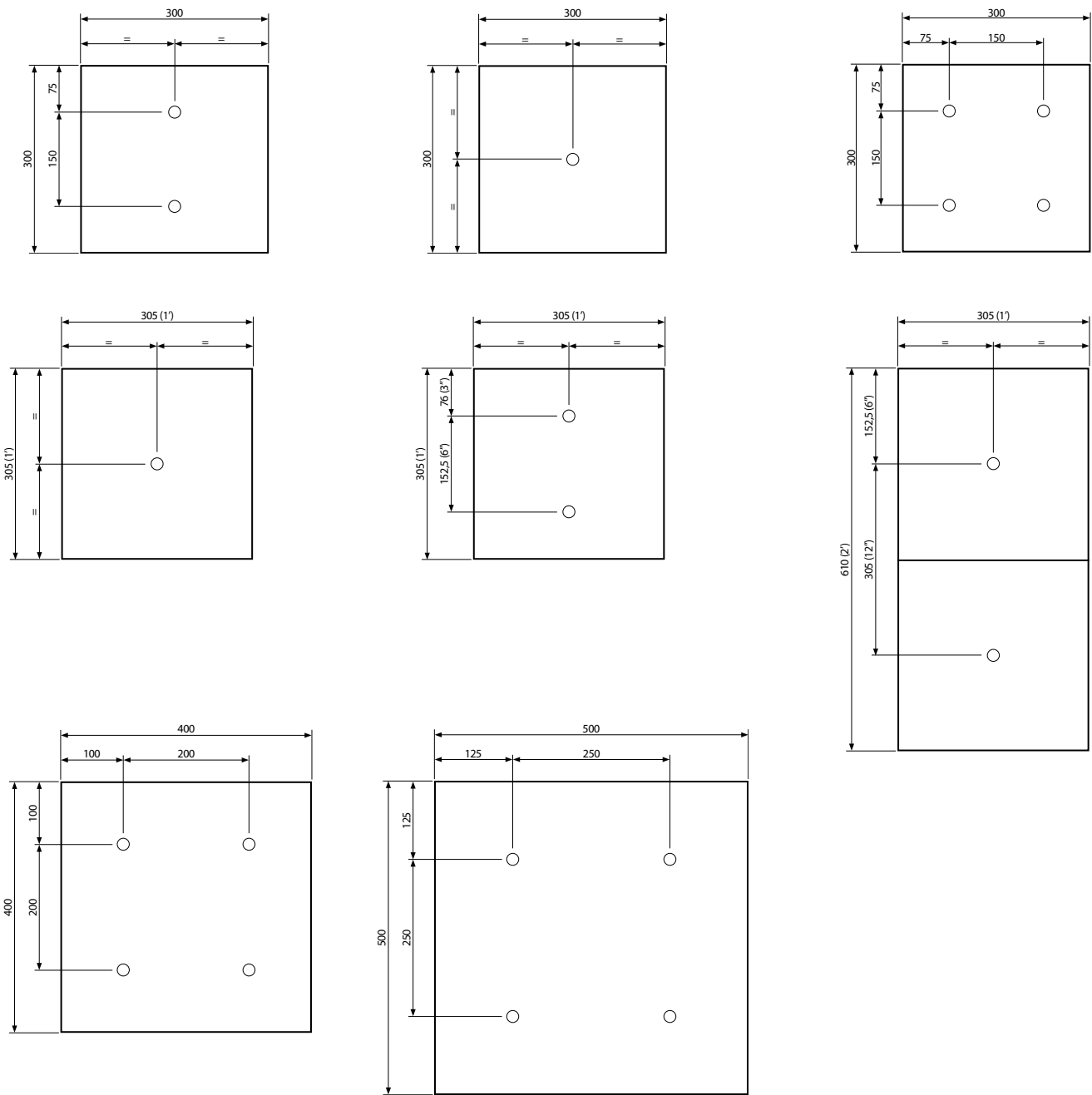
Trellex Poly-Cer - installation

Standard fastening pattern

Standard fastening pattern with stud welded bolt



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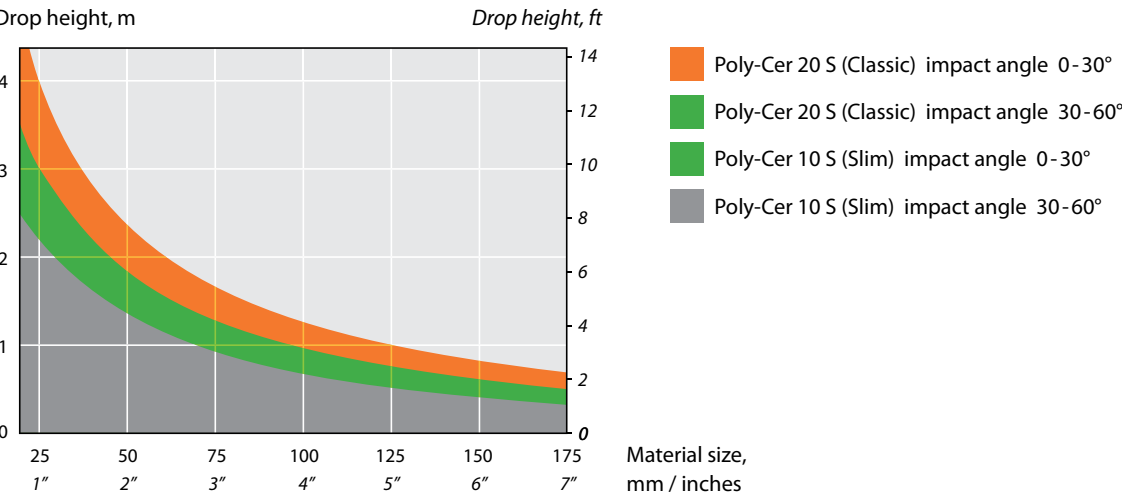
Trellex Poly-Cer - installation

General selection guide

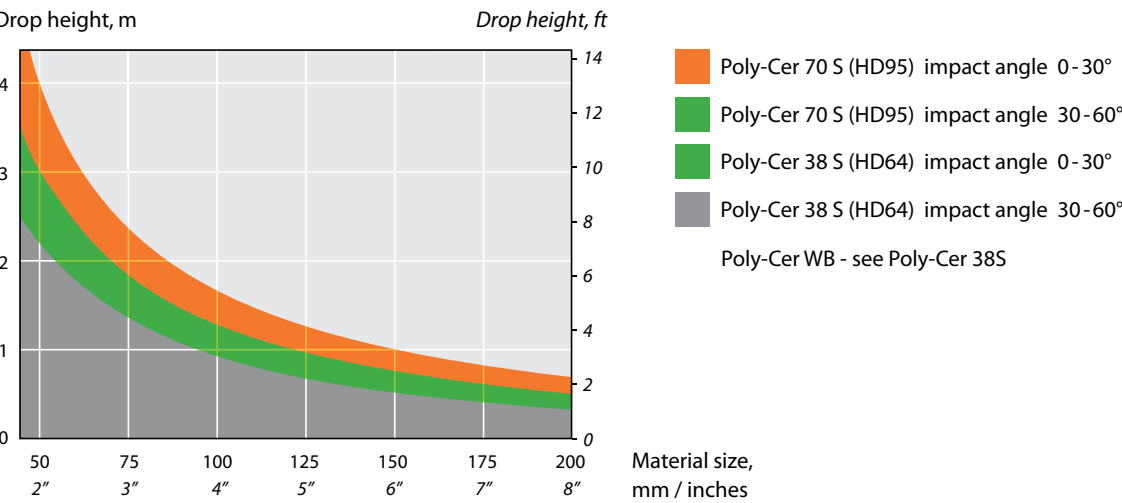
Poly-Cer 4S

Max drop height	1 m
Wear angle	0°-20°
Material size	max 25 mm, F75 - 10 mm

Poly-Cer 10S and 20S



Poly-Cer 38S and 70S



Trellex Wear Elements



Trellex Wear Elements includes a wide range of basic wear plates manufactured in rubber or polyurethane. The wear elements provide first class wear protection in applications that are subject to wear and noise.

Wear improvement

Improve the wear life of the origin equipment by protecting this with rubber wear plates – wet or dry application, small or large material size and different impact angles. All for reaching the maximal lifetime and production capacity.

Flow improvement

Improve poorly material flow in the process caused by a narrow sector. Such spots can be a real bottleneck in the process and create a lot of additional work and unplanned downtime.

Noise-reduction

Excessive noise is a problem in mining and construction operations. Managing noise pollution is more important than ever. All wear rubber products such as Trellex will contribute to reducing noise and reduced noise means better work conditions.

Wide range of wear protection products designed to maximize productivity and profit

Trellex PP

Wear plates made of T60 wear rubber with hot-vulcanized steel reinforcement.

Trellex SP

Wear plates made of T60 rubber. Featuring a serrated surface with hot-vulcanized steel reinforcement.

Trellex PT

Wear plates made of T60 wear rubber with hot-vulcanized aluminum fixing profiles.

Trellex PPU

Wear plates made of polyurethane and backed with a cast-in steel reinforcement.

Trellex SB

Wear plates made of T60 wear rubber with molded holes for fixing. The holes are reinforced with fixed hot-vulcanized internal steel washers.

Trellex WB

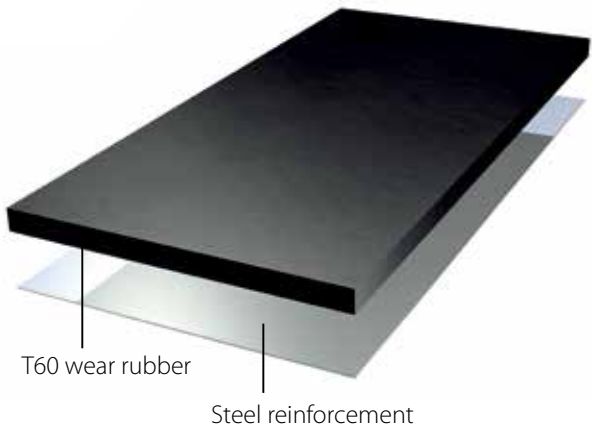
Wear bars made of T60 wear rubber with hot-vulcanized aluminum fixing profile.

Trellex FB

Trellex Flexback is made from T60 wear rubber or polyurethane. Hot-vulcanized or casted-in with an embedded perforated steel reinforcement. Also available as a serrated plate.

Trellex PP

Trellex PP wear plates are manufactured from T60 wear rubber and with hot-vulcanized steel reinforcement.



Excellent wear resistance in applications with both impact and sliding wear. The steel backing prevents small particles getting in under the lining and guarantees secure fixing. Wear plates reduce noise and vibrations, and are lighter compared to conventional steel lining.

Application areas

Trellex PP wear plates provide first class wear protection in such tough applications as truck beds, primary chutes, etc. and for secondary applications such as chutes, feeders, channels, silos and other applications that are subject to wear and noise. Medium-heavy rock and gravel industry. Demanding mining and industrial applications or wet and dry applications.

Technical description

Resists pH values 4-11 and all water types, and most oils and chemicals in moderate/small concentrations.

Other information

Trellex PP is most effective in the temperature range -25°/+70°C.

Trellex PP standard range

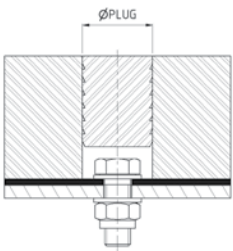
Part No.	Description	Width x Length (mm)	Weight (kg/ea)
631804	PP 13/3	1500 x 3000	156
881763	PP 15 /3	1500 x 3000	166
631812	PP 18/3	1500 x 3000	182
2327930	PP 20/5	1500 x 3000	251
2127190	PP 20/3	1500 x 3000	192
511402	PP 23/3	1500 x 3000	208
881714	PP 25/5	1500 x 3000	277
881698	PP 25/3	1500 x 3000	218
881722	PP 30/5	1500 x 3000	303
881706	PP 30/3	1500 x 3000	244
73049	PP 30/5	500 x1500	50
73189	PP 30/5	600 x 1500	60
361170	PP 30/5	750 x 1500	76
881730	PP 40/5	1500 x 3000	355
73064	PP 40/5	500 x 1500	59
73205	PP 40/5	600 x 1500	71
574178	PP 40/5	750 x 1500	88
680032	PP 50/5	500 x 1500	67
680034	PP 50/5	600 x 1500	81
680036	PP 50/5	750 x 1500	101
881748	PP 55/5	1500 x 3000	406
680041	PP 75/5	500 x 1000	59
680042	PP 75/5	500 x 1500	89
680043	PP 75/5	600 x 1000	71
680044	PP 75/5	600 x 1500	107
680045	PP 75/5	750 x 1000	89
680046	PP 75/5	750 x 1500	133
680052	PP 100/5	500 x 1500	110
680054	PP 100/5	600 x 1500	132
680056	PP 100/5	750 x 1500	166
680062	PP 125/5	500 x 1500	132
680066	PP 125/5	750 x 1500	198
680072	PP 150/5	500 x 1500	153
680076	PP 150/5	750 x 1500	230

Custom-made dimension upon request.

Trellex PP - installation

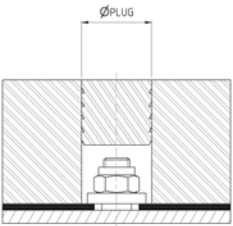
Fixing methods

For all PP13-PP150 wear plates



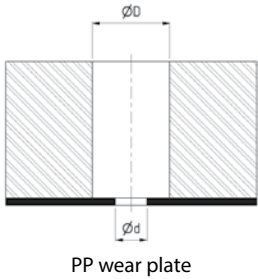
Through-bolt system					
Trellex PP	ØD	Ød	Plug	Bolt	Torque (Nm)
PP 13 - 40	40	14	45/35	M12	80
PP 50 - 75	54	18	60/50	M16	190
PP 100 - 150	54	22	60/50	M20	370

PP13-PP28 no standard plug.

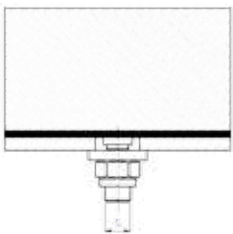


Stud-bolt system					
Trellex PP	ØD	Ød	Plug	Bolt	Torque (Nm)
PP 13 - 40	40	24	45/35	M12	40
PP 50 - 75	54	30	60/50	M16	110
PP 100 - 150	54	34	60/50	M20	220

PP13-PP40 no standard plug.



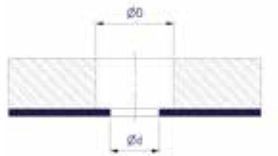
PP wear plate



Through stud-bolt system			
Trellex PP	Ød	S	Torque (Nm)
PP 13 - 40	24	M12 / UNC 1/2"	40
PP 50 - 75	30	M16 / UNC 5/8"	110
PP 100 - 150	34	M20 / UNC 3/4"	220

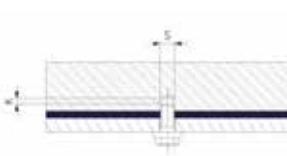
Only for PP13-PP40 wear plates

Plug welding system			
ØD	Ød	Plug	Weld
54	34	60/50	a2



Only for PP13-PP40 wear plates

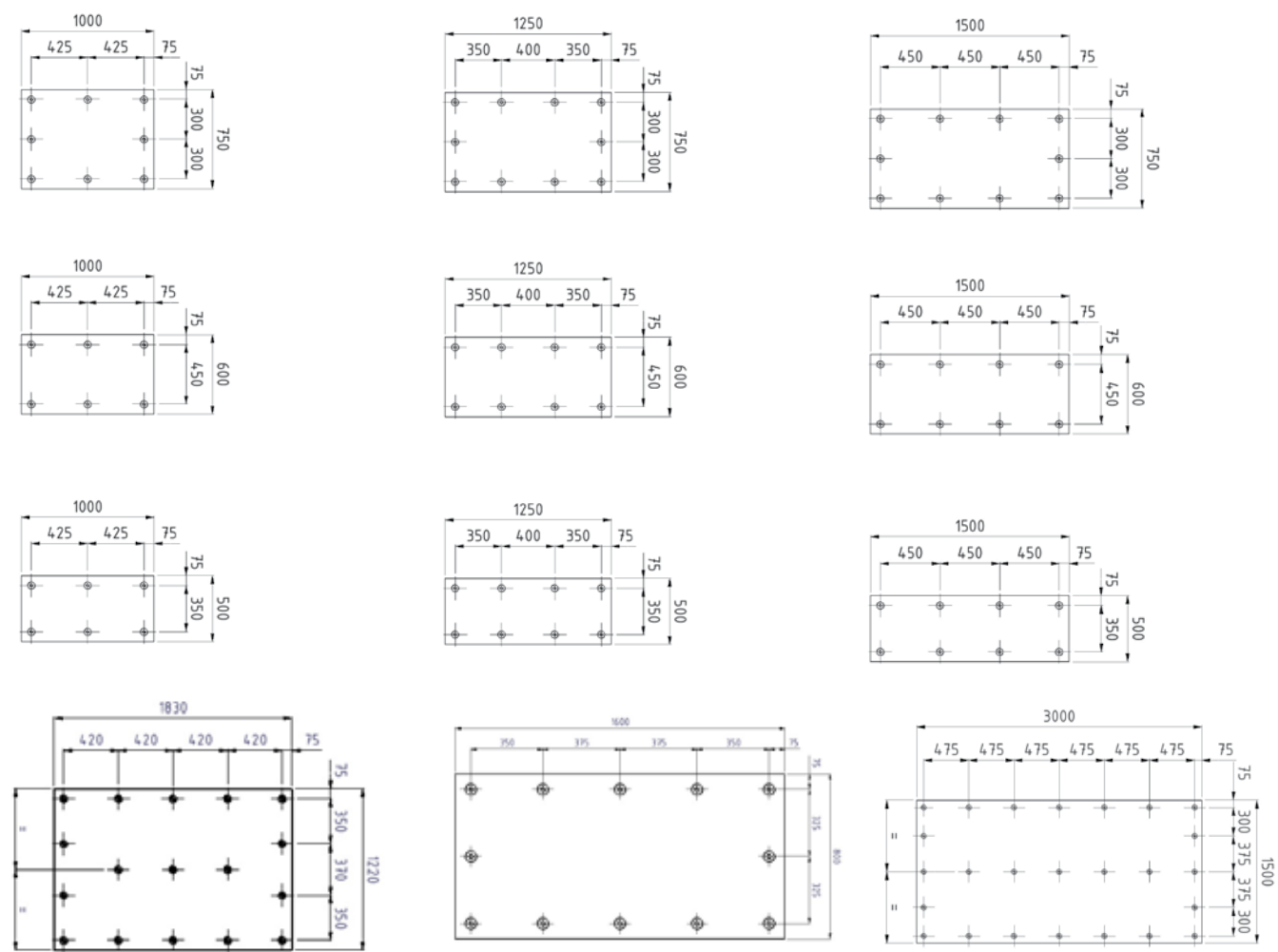
Self-tapping screw system				
Ød	K min	S	Threading Torque (Nm)	Tightening Torque (Nm)
9.2	2	M10	30	55



Note! All Trellex Lining systems to be installed without gaps between the liners.

Trellex PP - installation

Standard drilling patterns for Trellex PP



More info

Drilling pattern limits		
Measurement	Min (mm)	Max (mm)
A	50	150
B	50	500
C	50	600

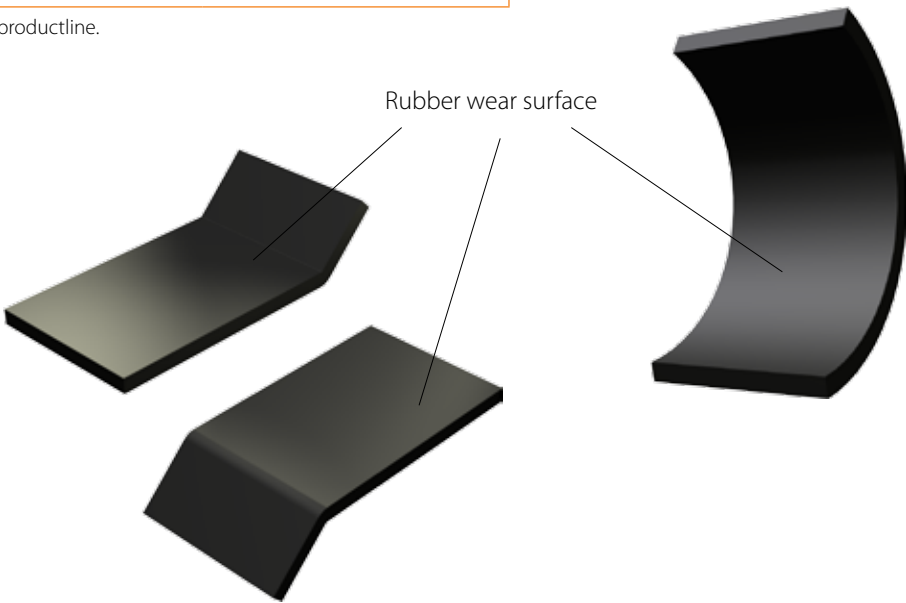
If L & W > 1000 mm extra "inside" holes (H) are needed

Trellex PP - installation

Max recommend bending radius Trellex PP

PP type	Max recommend bending radius (mm)	Max recommend bending degrees (°)
- PP 23	400	0-45
PP 25 - PP 40	500	0-45
PP 50 - PP 75	600	0-45

For PP 100 and bigger please contact the productline.

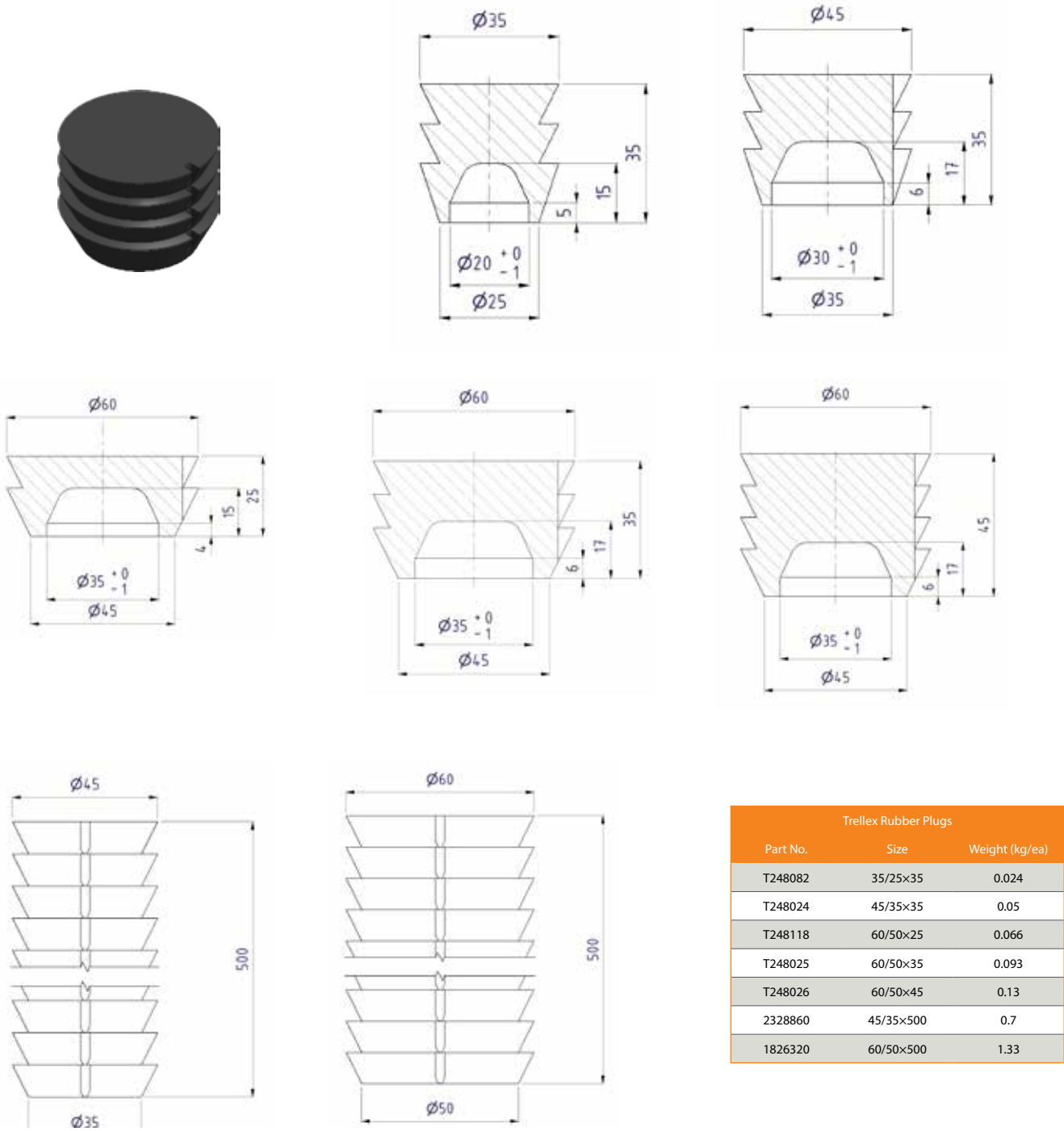


Fixing parts

Part No.	Description	Dimension	Weight (kg/ea)
2028000	Bolt M6S	M12x40	0.044 kg
2028010	Bolt M6S	M12x50	0.055 kg
292714	Bolt M6S	M16x40	0.088 kg
358127	Bolt M6S	M16x50	0.103 kg
2887870	Bolt M6S	M20x50	0.179 kg
294215	Nut nyloc	M12	0.018 kg
315150	Nut nyloc	M16	0.035 kg
213587	Nut nyloc	M20	0.065 kg
602458	Stud (welding) RB FZB incl.ceramic ring	M16x35	0.056 kg
2026880	Stud (welding) RB FZB incl.ceramic ring	M20x40	0.008 kg
588970TRB	Washer 6F / Black	M16	0.016 kg
597807	Washer 8F / Black	M20	0.02 kg
401810	Washer BRB for M12	2x13/24	0.005 kg
212803	Washer BRB for M16	3x17/30	0.012 kg
352393	Washer BRB for M20	3x21/36	0.016 kg
T200016	Washer D45	3x18/45	0.03 kg
1762100	Screw M6SF-Taptite	M10X20	0.014

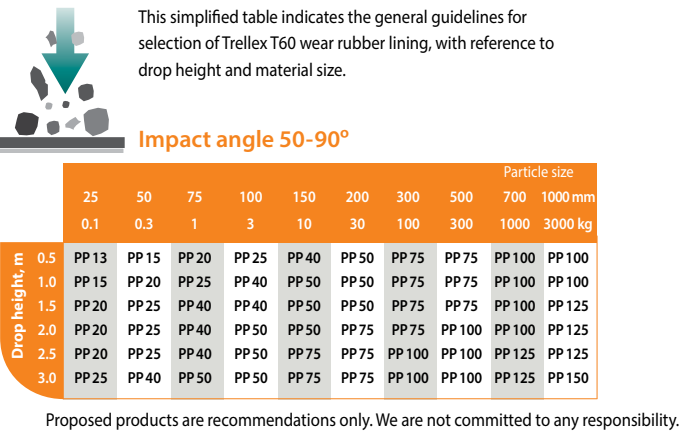
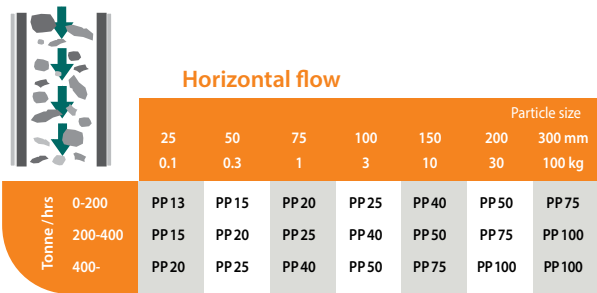
Trellex PP - installation

Trellex rubber plugs standard range



Trellex PP - guide

General selection guide



Proposed products are recommendations only. We are not committed to any responsibility.

Trellex PPU

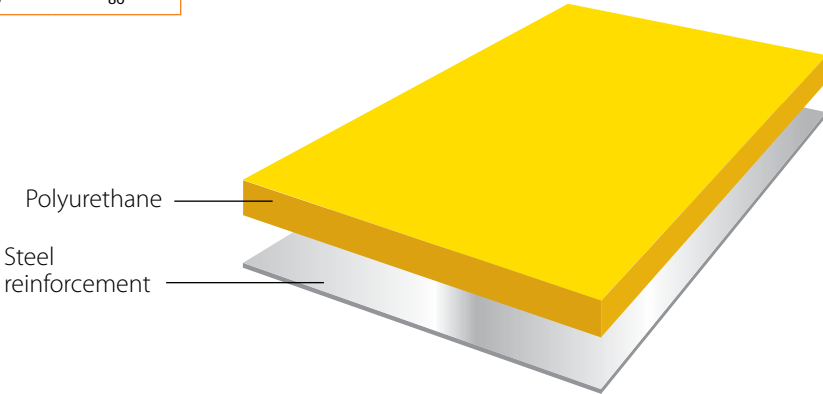
Trellex PPU wear plates are made of polyurethane and backed with a cast-in steel reinforcement.



Trellex PPU standard range

Part No	Description	Width x Length (mm)	Weight (kg/ea)
690110-80	PPU 10/3	1000 x 2000	62
690115-80	PPU 15/3	1000 x 2000	74
690120-80	PPU 20/3	1000 x 2000	86

Other dimensions on request.



Excellent wear resistance in applications with sliding wear. The steel reinforcement prevents the possibility of small particles getting in under the lining. The steel reinforcement also guarantees secure fixing so that the wear plates remain together even if the lining is exposed to extremely abrasive and sharp particles. Trellex PPU wear plates reduce noise and vibrations, and are lighter than conventional steel lining.

Application areas

Trellex PPU wear plates provide excellent wear protection for chutes, channels, bins and other applications that are subject to wear and noise. Medium and light applications in constructions and mining industry.

Technical description

Resists pH values 4-9 but is not designed for underwater applications. Resists attack from most oils and

chemicals and also environments exposed to ozone. Supplied with a standard hardness of 78 sH(A) (yellow). Also available as alternatives in hardnesses of 70 sH(A) (blue) and 90 sH(A) (green).

Other information

Trellex PPU is most effective in temperature -20°/+70°C.

Trellex PPU - installation

Fixing methods



Through bolt



Stud welded bolt



Plug welded



Self-tapping screw

Drilling pattern

See recommendation page 26 Trellex PP.

Note! All Trellex Lining systems to be installed without gaps between the liners.

Trellex PT

Trellex PT wear plates are manufactured from T60 wear rubber and include hot vulcanized aluminum fixing profiles.



Excellent wear resistance in applications with both impact and sliding wear. The vulcanized aluminum profiles allow for fewer fixing points than steel-reinforced wear plates. Trellex PT wear plates reduce noise and vibrations, and are lighter compared to conventional steel lining.

Application areas

Trellex PT wear plates provide excellent wear protection for feeders, primary bins, chutes, silos and other applications that are subject to wear and noise. Medium-heavy rock and gravel industry. Demanding mining and industrial applications.

Technical description

Resists pH values 4-9 and all water types, also most oils and chemicals in moderate/small concentrations.

Other information

Trellex PT is most effective in the temperature range -25°/+70°C.



Trellex PT standard range

Part No.	Description	Width x Length (mm)	Weigth (kg/ea)
680232	PT 50	500 x 1500	48
680234	PT 50	600 x 1500	56
680236	PT 50	750 x 1500	69
680242	PT 75	500 x 1500	69
680244	PT 75	600 x 1500	81
680246	PT 75	750 x 1500	101
680252	PT 100	500 x 1500	90
680254	PT 100	600 x 1500	107
680256	PT 100	750 x 1500	132

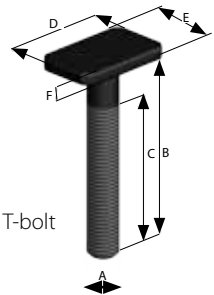
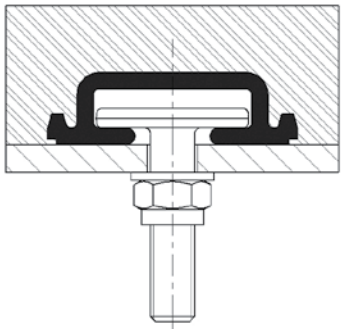
Trellex PT - installation

Fixing methods

Standard attachment details for Trellex PT



T-bolt fixing system



Fastening dimensions for through-bolt system			
	Bolt size	T-bolt	Torque (Nm)
PT 50/75	M16	TF 35/55	190
PT 100	M20	TF 55	370

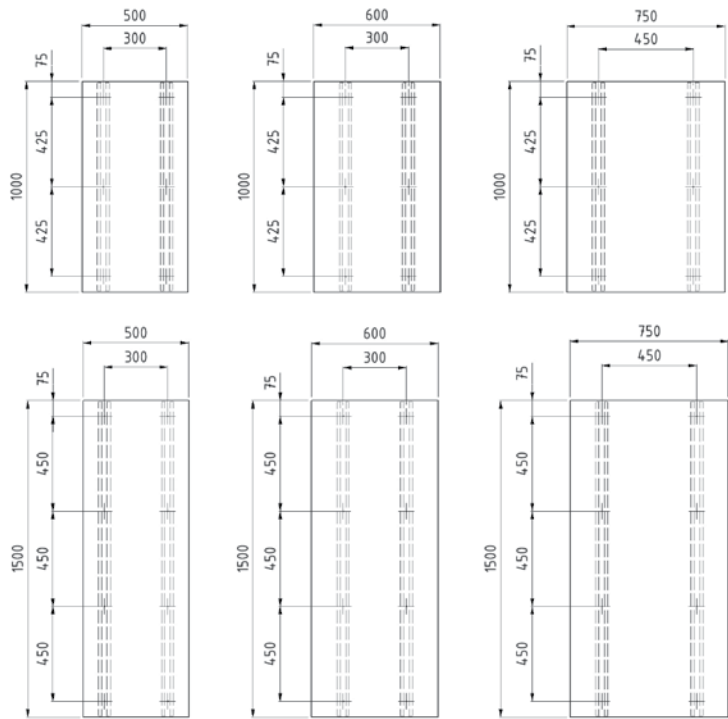
Part No.	Description	A	B/C	DxE	F	Weight kg/ea
539320	TF 35/25	M12	75/65	35x25	6	0.11
2934400	TF 35/55	M16	100/80	55x35	7	0.26
2934210	TF 35/55	M16	70/50	55x35	7	0.22
265678	TF 55	M20	140/110	55x55	10	0.58
213751	TF 55	M20	110/100	55x55	10	0.51
213579	TF 55	M20	80/70	55x55	10	0.43
396135	TF 55	M20	50/40	55x55	10	0.36

More info

Fixing pattern limits

Measurement	Min (mm)	Max (mm)
A	50	150
B	50	600

Standard fixing patterns for Trellex PT



Trellex SB

Trellex SB wear plates are manufactured from T60 wear rubber with molded holes for fixing. The holes are reinforced with fixed hot vulcanized internal steel washers.



Excellent wear resistance in applications with both impact and sliding wear. The wear plates are bendable and easy to cut. They reduce noise and vibrations, and are lighter compared to conventional steel lining.

Application areas

Trellex SB wear plates provide excellent wear protection for feeders, bins, chutes,

silos and other applications that are subject to wear and noise. Medium heavy rock and gravel industry. Demanding mining and industrial applications.

Technical description

Resists pH values 4-11 and all water types, most oils and chemicals in and moderate/small concentrations.

Other information

Trellex SB is most effective in the temperature range -25°/+70°C.

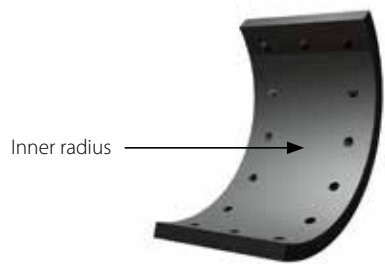
Trellex SB standard range

Part No.	Description	Width x length (mm)	Weight (kg/ea)
680421	SB 40	500 x 1000	25
680427	SB 40	500 x 1250	31
680422	SB 40	500 x 1500	37
680461	SB 60	500 x 1000	35
680467	SB 60	500 x 1250	45
680441	SB 75	500 x 1000	44
680447	SB 75	500 x 1250	55
680442	SB 75	500 x 1500	66
680451	SB 100	500 x 1000	58
680457	SB 100	500 x 1250	72,5

Max bending radius Trellex SB

SB type	Inner radius (mm)
SB 40-80	600
SB 100	800

For SB 100 and bigger please contact the productline.

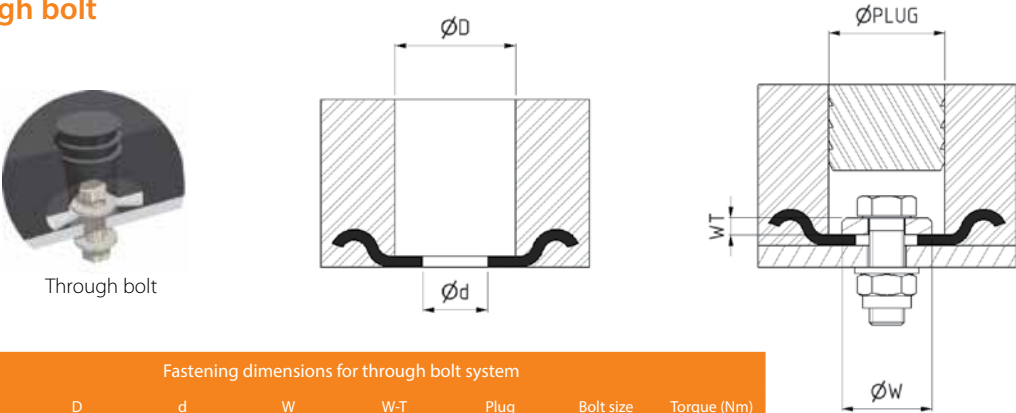


Trellex SB - installation

Fixing methods

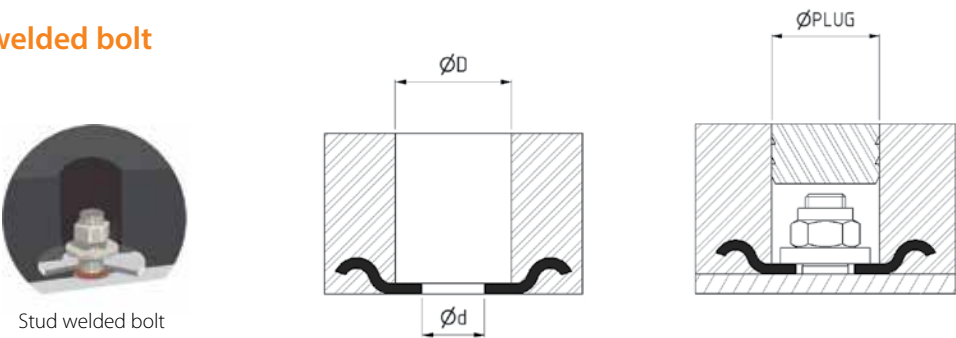
Standard attachment details for Trellex SB

Through bolt

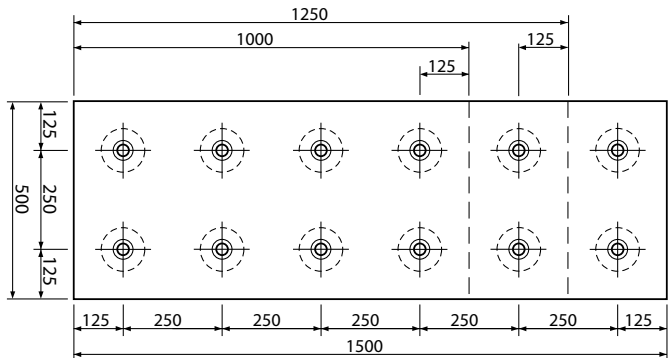


Fastening dimensions for through bolt system							
	D	d	W	W-T	Plug	Bolt size	Torque (Nm)
SB 40 - 75	54	29	Min 40	Min 6	60/50	M16	190
SB 100	54	29	Min 40	Min 6	60/50	M20	370

Stud welded bolt



Fastening dimensions for stud welded bolt system					
	D	d	Plug	Bolt size	Torque (Nm)
SB 40 - 75	54	29	60/50	M16	110
SB 100	54	29	60/50	M20	220

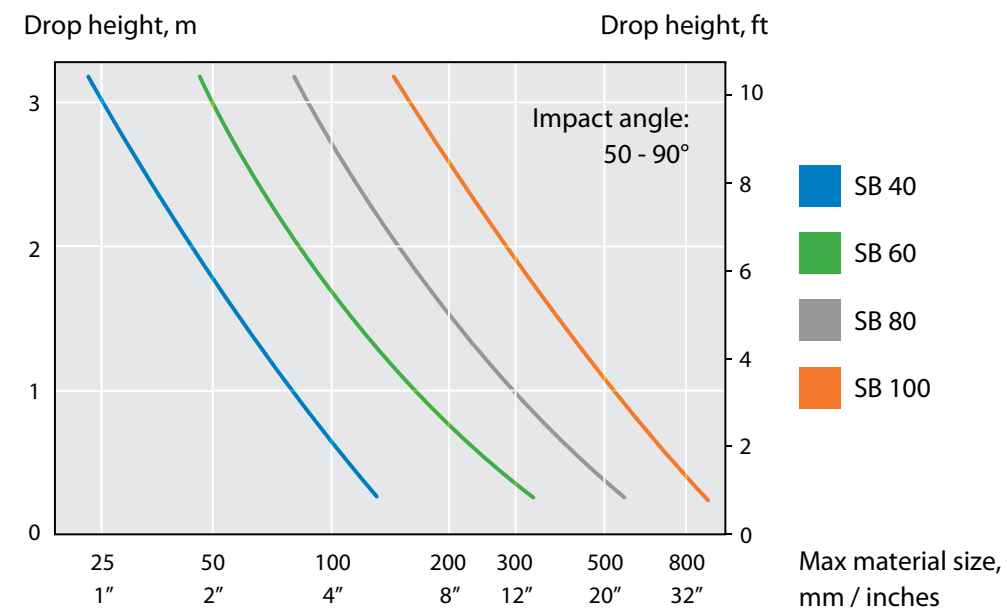


Note! All Trellex Lining systems to be installed without gaps between the liners.

Trellex SB - guide

General selection guide

Trellex SB wear plate



Notes

Trellex SP

Trellex SP wear plates are manufactured from T60 wear rubber. They feature a serrated surface and are reinforced with fixed hotvulcanized steel reinforcement.



Excellent wear resistance in applications with both impact and sliding wear. The steel backing guarantees secure fixing so that the wear plates remain together even if the lining is exposed to extremely abrasive and sharp particles. The serrated surface has been designed to provide optimal life for material with impact angles between 15° and 50°. Trellex SP wear plates reduce noise and vibrations, and are lighter compared to conventional steel lining.

Application areas
Trellex SP wear plates provide excellent wear protection for bins, chutes, silos and other applications that are subject to wear and noise. Medium-heavy rock and gravel industry. Demanding mining and industrial applications.

Technical description
Resists pH values 4-11 and all water types, most oils and chemicals in and moderate/small concentrations.

Other information
Trellex SP is most effective in the temperature range -25°/+70°C.



Trellex SP standard range

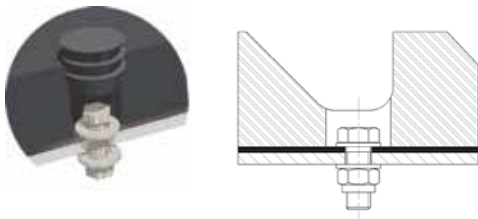
Part No.	Description	Width x length (mm)	Weight (kg/ea)
680131	SP 50/5	500 x 1000	38
680132	SP 50/5	500 x 1500	57
680133	SP 50/5	600 x 1000	46
680134	SP 50/5	600 x 1500	69
680135	SP 50/5	750 x 1000	57
680136	SP 50/5	750 x 1500	86
680142	SP 75/5	500 x 1500	70
680143	SP 75/5	600 x 1000	56
680146	SP 75/5	750 x 1500	105
680152	SP 100/5	500 x 1500	81
680156	SP 100/5	750 x 1500	121
680162	SP 125/5	500 x 1500	95
680166	SP 125/5	750 x 1500	143

Trellex SP - installation

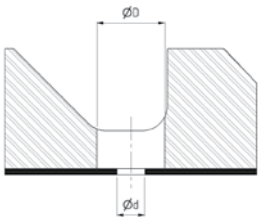
Fixing methods

Standard attachment details for Trellex SP

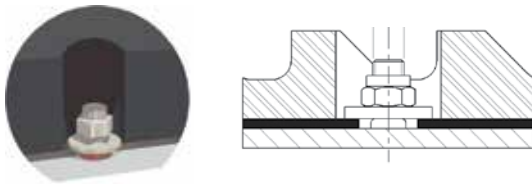
Fastening dimensions for through bolt system				
	D	d	Bolt	Torque (Nm)
SP 50/75	40	18	M16	190
SP 100/125	54	22	M20	370



Through bolt



Fastening dimensions for stud bolt system				
	D	d	Bolt	Torque (Nm)
SP 50/75	54	30	M16	110
SP 100/125	54	34	M20	220



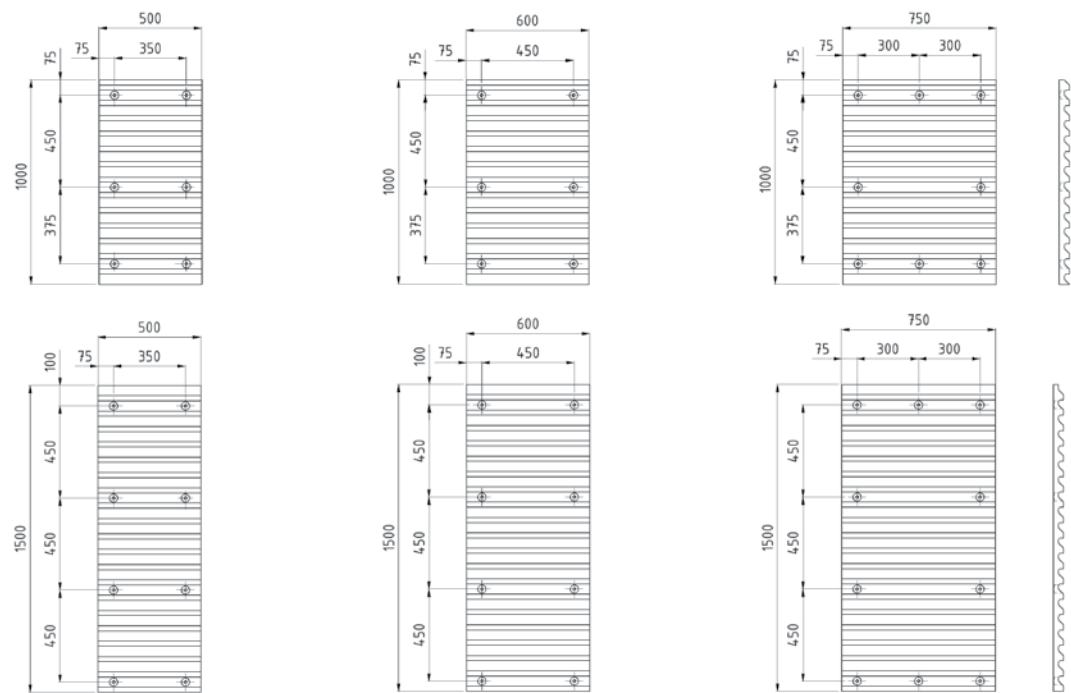
Stud welded bolt

More info

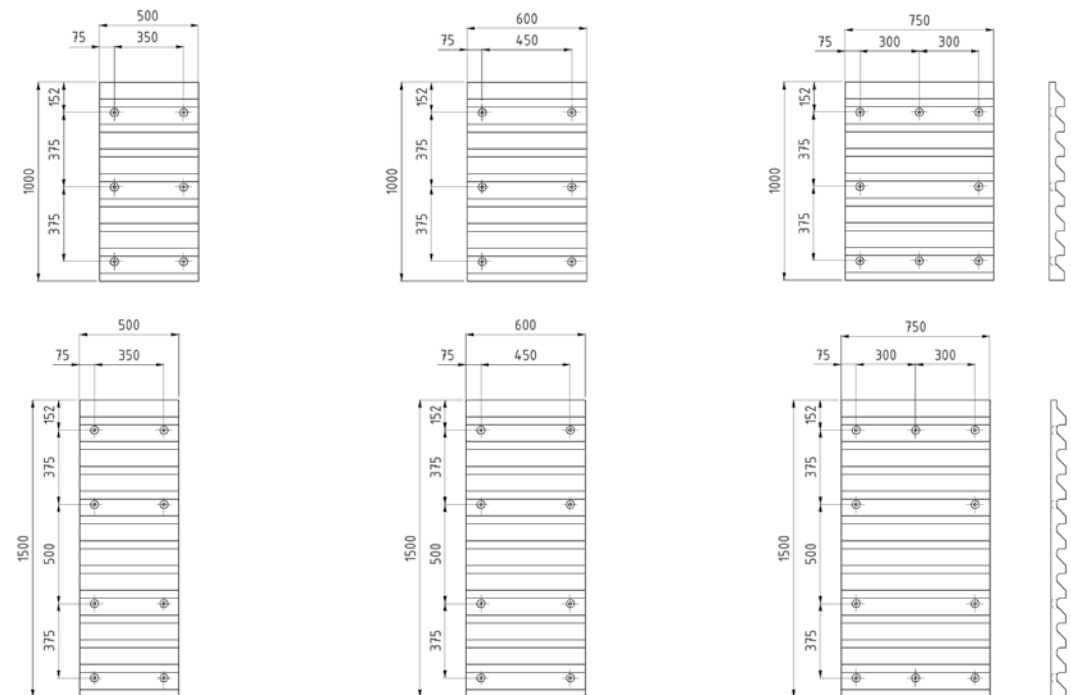
Drilling pattern limits		
Measurement	Min (mm)	Max (mm)
A	50	150
B	50	200
C	50	600

Trellex SP - installation

Standard drilling patterns for Trellex SP 50

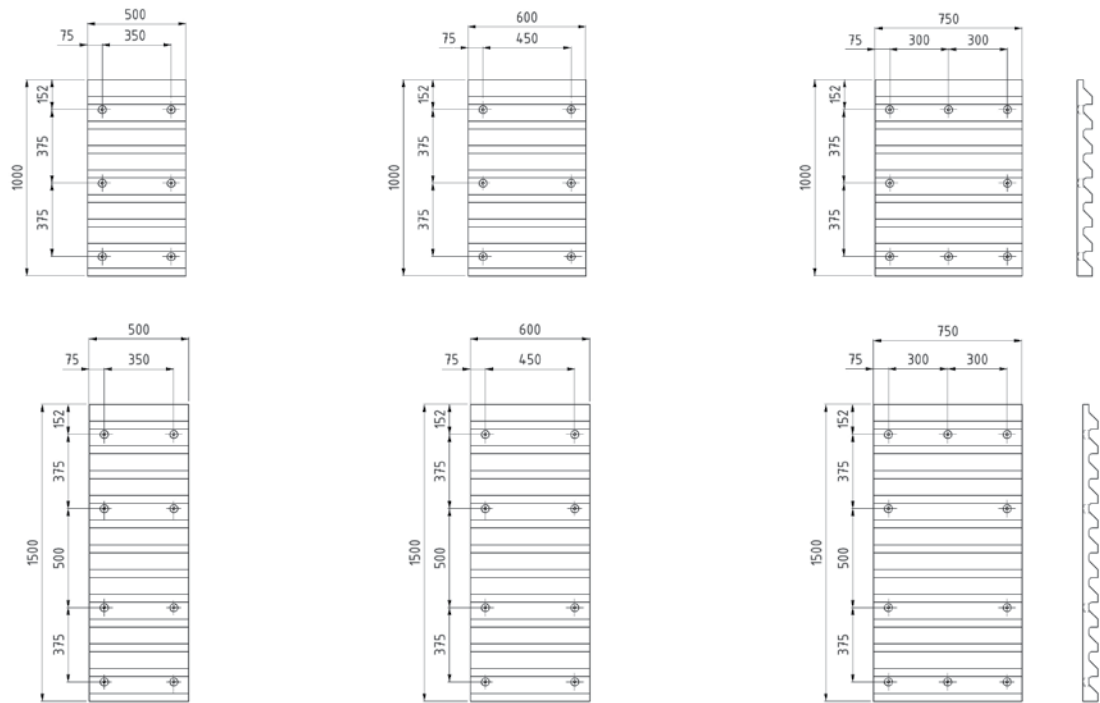


Standard drilling patterns for Trellex SP 75

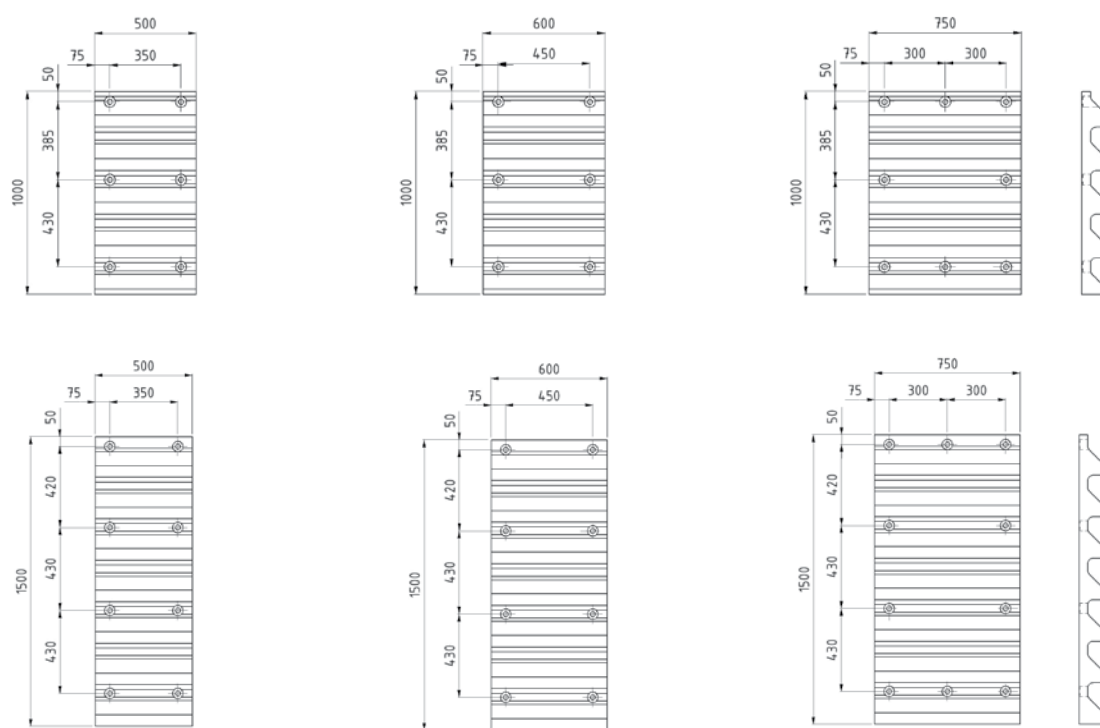


Trellex SP - installation

Standard drilling patterns for Trellex SP 100

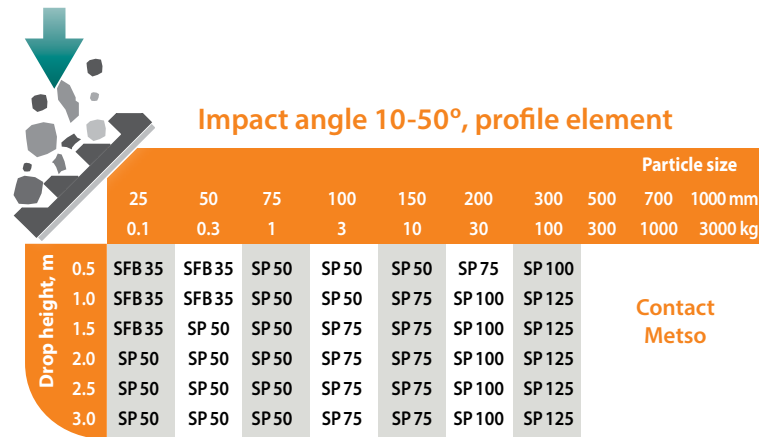


Standard drilling patterns for Trellex SP 125



Trellex SP - guide

General selection guide



Proposed products are recommendations only. We are not committed to any responsibility.

Notes

Trellex WB

Trellex WB wear bars are manufactured from T60 wear rubber and include hot-vulcanized aluminum fixing profile.

Excellent wear resistance in applications with both impact and sliding wear. The embedded aluminum profile allow for fewer fixing points than steel-reinforced wear plates. Trellex WB wear bars reduce noise and vibrations, and are lighter compared to conventional steel shrouding.

Application areas

Trellex WB wear bars provide excellent wear protection for bins, chutes, silos and other applications that are subject to wear and noise. Medium-heavy rock and gravel industry. Demanding mining and industrial applications.

Technical description

Resists pH values 4-9 and all water types, also most oils and chemicals in moderate/small concentrations.

Other information

Trellex WB is most effective in the temperature range -25°/+70°C.



Trellex WB standard range

Part No.	Description	Height (mm)	Weight (kg/ea)
74104	WB 50	50	4.5
74120	WB 50	75	6.6
74229	WB 75	100	13.3
74187	WB 75	50	7
74203	WB 75	75	10.2
74245	WB 100	50	9.1
74260	WB 100	75	13.4
74286	WB 100	100	17.6
74302	WB 100	125	21.9
74369	WB 125	100	21.9
74385	WB 125	125	27.2
74401	WB 125	150	32.4
74427	WB 150	100	27.2
74443	WB 150	125	33.6
74476	WB 150	150	39.9

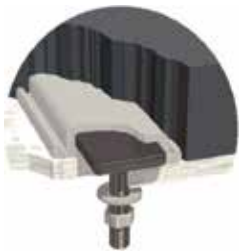
Standard length 1500 mm.

Trellex WB - installation

Fixing methods

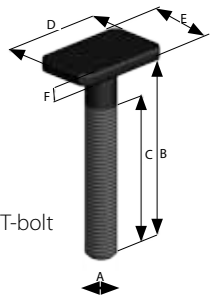
Description	Recommended T-bolt	Recommended torque (Nm)
WB 50	M12 TF 35/25	80
WB 75	M16 TF 35/55 (M12 TF 35/25)	190 (80)
WB 100	M20 TF 55 (M16 TF 35/55)	370 (190)
WB 125	M20 TF 55	370
WB 150	M20 TF 55	370

We recommend using 4 fixing points for standard WB length 1500 mm and 3 fixing points for lengths of 1000 mm.



T-bolt fixing system

Part No.	Description	A	B/C	DxE	F	Weight (kg/ea)
539320	TF 35/25	M12	75/65	35x25	6	0.11
2934400	TF 35/55	M16	100/80	55x35	7	0.26
2934210	TF 35/55	M16	70/50	55x35	7	0.22
265678	TF 55	M20	140/110	55x55	10	0.58
213751	TF 55	M20	110/100	55x55	10	0.51
213579	TF 55	M20	80/70	55x55	10	0.43
396135	TF 55	M20	50/40	55x55	10	0.36



T-bolt

Trellex Flexback

Trellex Flexback is manufactured from T60 wear rubber or polyurethane. It is hot-vulcanized or casted-in with an embedded perforated steel reinforcement.



Trellex Flexback Serrated

Trellex Flexback Serrated is manufactured from T60 wear rubber and is hot vulcanized with embedded, perforated steel reinforcement and is optimized for handling material impacting at angles between 15° and 50°.



Trellex Flexback shows excellent wear resistance in lighter and medium applications. The reinforcement makes it possible to construct self-supporting channels and chutes with simple supports of angle iron and flat iron. The Flexback products reduce noise and vibrations, and are lighter compared to conventional steel lining. Trellex Flexback is available in rubber and polyurethane.

Trellex Flexback Serrated is available in rubber where the serrated surface has been designed to provide optimal life for material with impact angles between 15° and 50°.

Application areas
Flexback provides excellent wear protection for chutes, channels, bins and other applications that are subject to wear and noise in construction and mining industry, with secondary and lighter applications.

Technical description
Flexback rubber
Resists pH values between 4 -11 and all water types, and most oils and chemicals in moderate/small concentrations.

Flexback PU
Resists pH values between 4 - 11, but is not designed for underwater

applications. Resists attack from most oils and chemicals and is environments exposed to ozone. Supplied with a standard hardness of 78 sH(A) (yellow). Also available as alternatives in hardnesses of 70 sH(A) (blue) and 90 sH(A) (green).

Flexback Serrated
Resists pH values 4 -11 and all water types, and most oils and chemicals in moderate/small concentrations.

Other information
Trellex Flexback products are most effective in the temperature range -25°/70°C.

Trellex Flexback RU standard range

Part No.	Description	Width x length (mm)	Weight (kg/ea)
1442540	FB 10	1270 x 3000	63
1442550	FB 15	1270 x 3000	84
1442560	FB 20	1270 x 3000	105
1442570	FB 25	1270 x 3000	127
1442900	FB 30	1270 x 3000	148

Trellex Flexback PU standard range

Part No.	Description	Width x length (mm)	Weight (kg/ea)
690310-80	FBU 10	1270 x 3000	60
690315-80	FBU 15	1270 x 3000	84
690320-80	FBU 20	1270 x 3000	106

Other thicknesses and hardnesses on request.

Trellex Flexback Serrated standard range

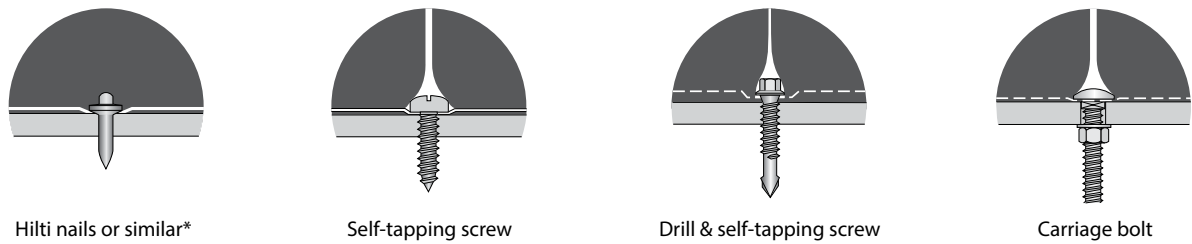
Part No.	Description	Width x length (mm)	Weight (kg/ea)
2929110	FBS 35	1270 x 3000	119



Trellex Flexback - installation

Fixing methods

Standard attachment system



*Hilti nails or similar can be used on steel plates/structures with hardness up to 250HB (Brinell)

More info

Measurement	Min (mm)	Max (mm)
A	20	50
B	50	200*
C	50	600

* For Flexback serrated 236 mm

Trellex Flexback - guide

General selection guide

Trellex Flexback RU
Wear angle 0-10°

		Particle size						
		25	50	75	100	150	200	300 mm
		0.1	0.3	1	3	10	30	100 kg
Tonne / hrs	0-200	FB 15	FB 20	FB 25	FB 30	-----	-----	-----
	200-400	FB 20	FB 25	FB 30	-----	-----	-----	-----
	400-	FB 25	FB 30	-----	-----	-----	-----	-----

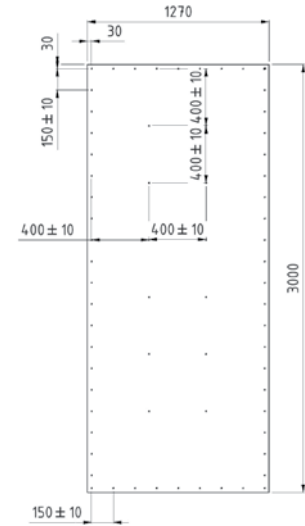
Proposed products are recommendations only. We are not committed to any responsibility.

Trellex Flexback RU

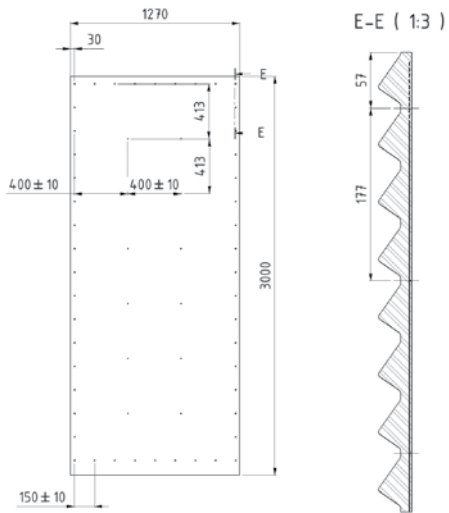
		Particle size						
		25	50	75	100	150	200	300 mm
		0.1	0.3	1	3	10	30	100 kg
Tonne / hrs	0-200	FB 10	FB 15	FB 20	FB 30	Outsider parameters, see Trellex PP Guide		
	200-400	FB 15	FB 20	FB 25				
	400-	FB 20	FB 25					

Proposed products are recommendations only. We are not committed to any responsibility.

Standard fastening pattern for Flexback RU and PU

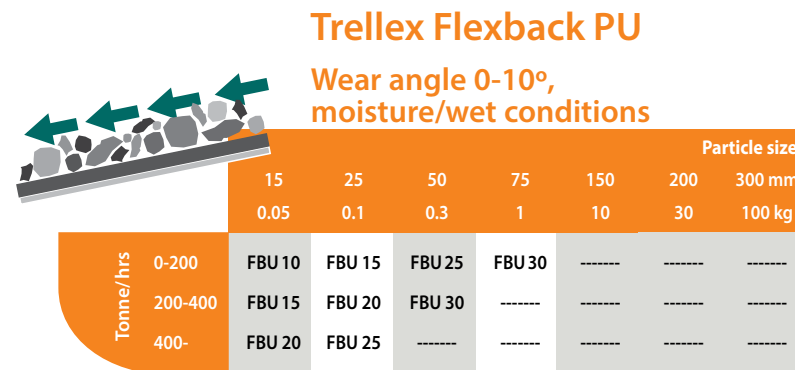


Standard fastening pattern for Flexback serrated

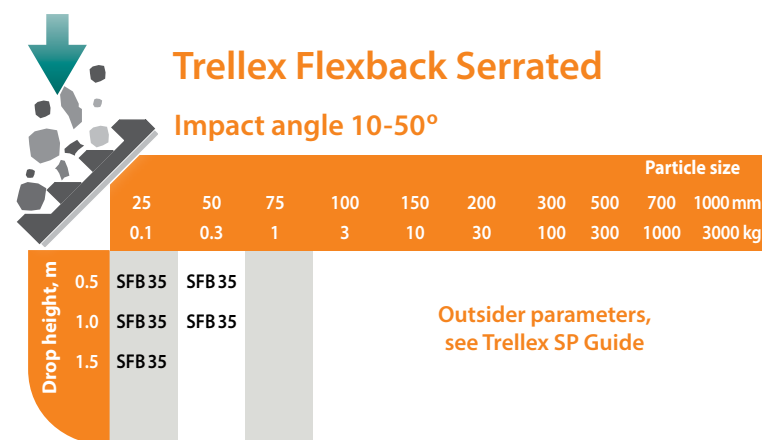


Trellex Flexback- guide

General selection guide



Proposed products are recommendations only. We are not committed to any responsibility.



Proposed products are recommendations only. We are not committed to any responsibility.

Notes

Trellex SQ 300



Fully recyclable modular system for wear protection.

- Reduced noise protects workers hearing
- Modular system means lighter work
- Cutting reduces emissions
- No welding, no risk
- PAH - free eliminates cancer concerns



At last, the mining and construction industry has access to a modern environmentally friendly wear protection system which reduces impacts and improves health and safety in a variety of important ways - all without increasing costs or sacrificing operational efficiency. Suitable for use in mining chutes, transfer points and other areas subject to wear, Trellex SQ 300 provides excellent protection in many applications, keeping material flow up and maintenance time down.

Choice of materials

Trellex SQ 300 plates are available in three different materials: rubber, polyurethane or ceramic (not recyclable).

Technical description

The modular system can handle particle sizes up to 200 mm (8"). Resists pH values 4-9 and all water types, and resists oils and chemicals in moderate/sm concentrations.

Other information

Trellex SQ 300 is most effective in the temperature range -25°/+70°C.

Installation

Trellex SQ 300 has been designed for simplicity of installation and minimum downtime by using patented fastening system. Installation manual in each box provides guidelines for easy installation. Rubber and polyurethane are easily cut with a knife or Alu-Cut machine.



Trellex SQ 300 Box contains 66 pcs of modules, plugs, spiders. One box cover ~6m² lining area.

Trellex SQ 300 Module standard range

Description	Material	Fixing
SQ 300 RU 50	Rubber T-60	Spider + PU-plug
SQ 300 RU 40	Rubber T-60	Spider + PU-plug
SQ 300 RU 30	Rubber T-60	Spiderplug
SQ 300 PU 50	PU 80°	Spider +PU-plug
SQ 300 PU 40	PU 80°	Spider +PU-plug
SQ 300 PU 30	PU 70°	Spiderplug
SQ 300 CE 40	Ceramic & PU	2 part spider + CE-plug

All modules are 300x300 mm.

Box standard range

Part No.	Description	Weight (kg/ea)
660343	SQ 300 Box CE 40	520.5
6660551	SQ 300 Box PU 30	215.2
6660274	SQ 300 Box PU 40	283.1
6660550	SQ 300 Box RU 30	208.6
660340	SQ 300 Box RU 40	293
660350	SQ 300 Box RU 50	363.7

SQ300 Box PU50 on request.

Trellex SQ 300 - guide

Fixing methods

Details of included items Trellex SQ 300 RU



30 mm / 1,18"

Part No.	Description
6660224	SQ RU 30 Module
6650296	Spider



40 mm / 1,58"

Part No.	Description
660399	SQ RU 40 Module
660329	Spider
660325	PU-plug



50 mm / 2"

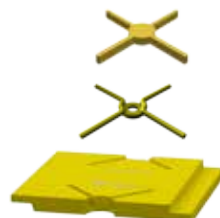
Part No.	Description
660398	SQ RU 50 Module
660329	Spider
660326	PU-plug

Details of included items Trellex SQ 300 PU



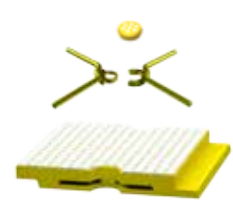
30 mm / 1,18"

Part No.	Description
660327	SQ PU 30 Module
6650296	Spider



40 mm / 1,58"

Part No.	Description
660328	SQ PU 40 Module
660329	Spider
660325	PU-plug



40 mm / 1,58"

Part No.	Description
660324	SQ CE 40 Module
660330	Spider (2 parts)
2931830	Washer
660325	PU-plug

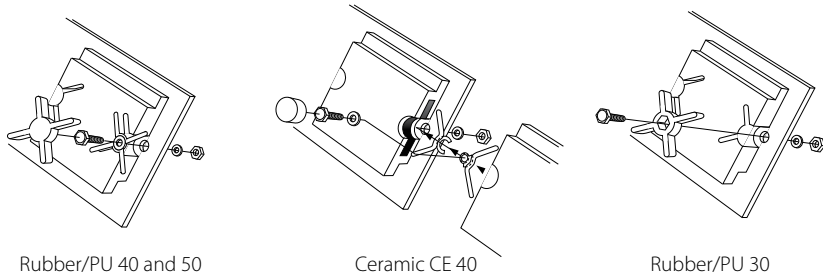
Note! All Trellex Lining systems to be installed without gaps between the liners.

Trellex SQ 300 - installation

Fixing methods

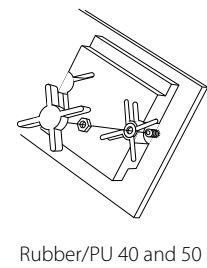
Through bolt

Bolt size	Recommended Torque (Nm)
M12	80
M16	190



Stud welded bolt

Stud bolt size	Recommended Torque (Nm)
M12	40
M16	110



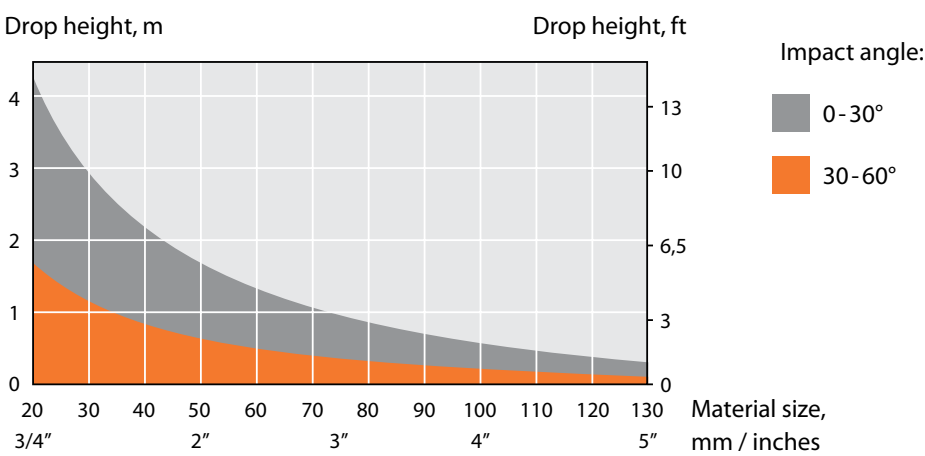
More info

Cutting limits		
Measurement	Min (mm)	Max (mm)
A	90	200

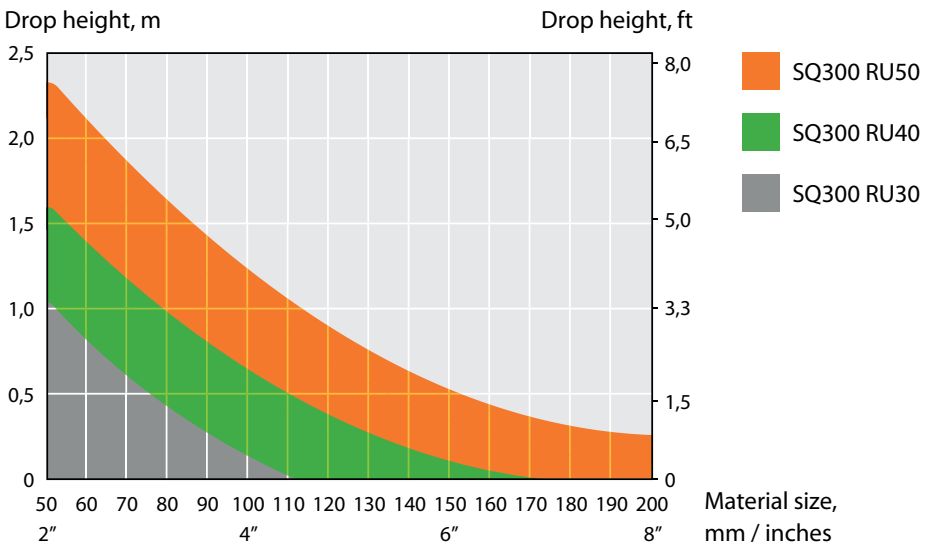
Trellex SQ 300 - guide

General selection guide

SQ 300 ceramic guide



SQ 300 rubber guide

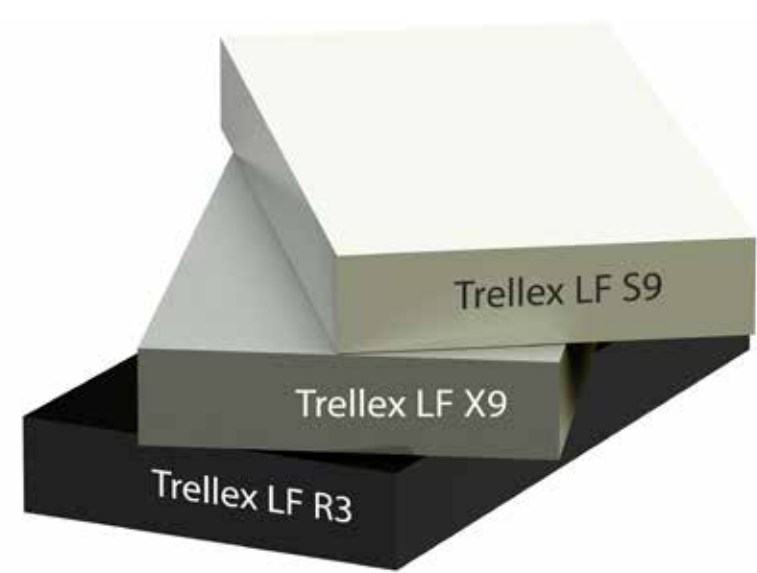


Note! For fine sand and wet applications please contact the productline.

Trellex LF



Trellex LF plates are made of an ultra high molecular weight polyethylene that minimizes surface friction to prevent material sticking.



Tolerances LF plates

6 mm sheets
1220 x 3015 mm
Width: -0.0/+10
Length: -0.0/+30

≥10 mm sheets
1220 x 3050 mm
Width: -0.0/+30
Length: -0.0/+60

Trellex LF standard range

Part No.	Description	Thickness x Width x Length (mm)	Weight (kg/ea)
1520100	Trellex LF R3	6x1220x3015	28
1520110	Trellex LF R3	10x1220x3050	35
1520120	Trellex LF R3	15x1220x3050	53
1520562	Trellex LF R3	20x1220x3050	71
1520130	Trellex LF R3	25x1220x3050	88
1520140	Trellex LF S9	6x1220x3015	28
1520150	Trellex LF S9	10x1220x3050	35
1520160	Trellex LF S9	15x1220x3050	52
1624520	Trellex LF S9	20x1220x3050	70
1520170	Trellex LF S9	25x1220x3050	87

Other qualities and dimensions on request.



Excellent for applications that require extremely low friction.

Application areas

Trellex LF Plates provide excellent solution for bins, chutes, silos and other low wear applications that have flow problems with sticky materials. Light duty applications with clogging problems and sticky materials.

Technical description

Resists most pH values and water types, and most chemicals in moderate concentrations.

Other information

Trellex LF is effective in the temperature range -60°/+70°C.

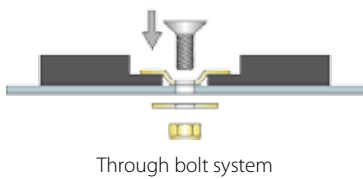
	Properties	Unit	Trellex LF S9	Trellex LF R3	Test method
General properties	Density	g/cm³	0.94	0.94	ISO 1183
	Molecular weight	g/mol	9x10⁶	-	
	Water absorption	%	<0.01	<0.01	DIN EN ISO 62
Mechanical properties	Tensile stress at yield	N/mm²	20	20	ISO 527-1
	Elongation at yield stress	%	15	12	ISO 527-1
	Elongation at break	%	>50	>50	ISO 527-1
	Hardness	Shore D	60	65	ISO 868
	Coefficient of sliding friction	mJ/mm²	0.1	0.15	ISO 179
Thermal properties	Thermal conductivity	W/mK	0.40	0.40	DIN 52612
	Coefficient of linear expansion between 20°C and 100°C	1/K	2x10⁻⁴	2x10⁻⁴	DIN 53752
	Vicat-softening temp. -VST/B50	°C	80	-	ISO 306
	Temperature range	°C	-50/+70	-50/+70	-
Electrical properties	Insulation resistivity	Ohm x cm	>10¹²	>10¹²	IEC 60093
	Surface resistivity	Ohm	>10¹²	>10¹²	IEC 60093

Data mentioned in table are average values ascertained by current statistical returns and tests. The data above are provided purely for information and shall not be regarded as binding. Other qualities and dimensions on request.

Trellex LF - installation

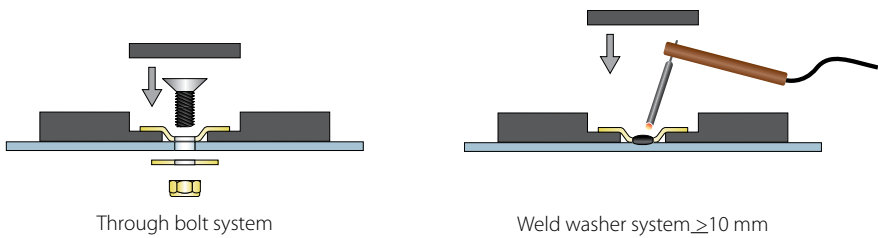
Fixing methods

Standard attachment system for Trellex LF thickness 6 mm



Through bolt system

Standard attachment system for Trellex LF thickness 10-25 mm



Through bolt system

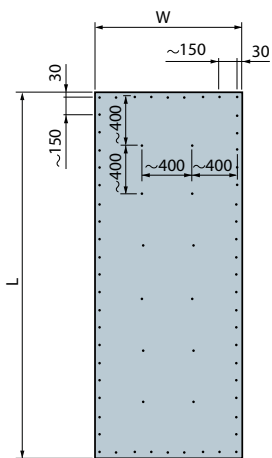
Weld washer system ≥10 mm

Part No.	Description (mm)	Weight (kg/ea)
ZX11214866	Fixing/welding washer dia 35	0.013
2971560	Bolt MF6S 8x40	0.015
819623	Washer BRB 10,5/22x2	0.0046
660795	Nut nyloc M8	0.0056
ZX11214867	Plug Ø 38x4 for Trellex LF plate 10 mm	0.005
ZX11263541	Plug Ø 38x9 for Trellex LF plate 15 mm	0.0135
ZX11263542	Plug Ø 38x13 for Trellex LF plate 20 mm	0.0195
ZX11265097	LF Drill	1.85
ZX11300365	Plug Ø 38x13 for Trellex LF plate 25 mm	0.0210

Fixing of LF plates thicker than 25 mm, please contact your local Metso support.

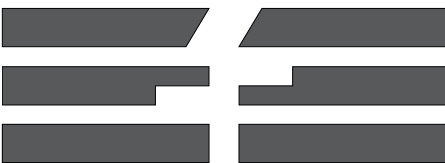
Trellex LF - installation

Recommended fixing pattern

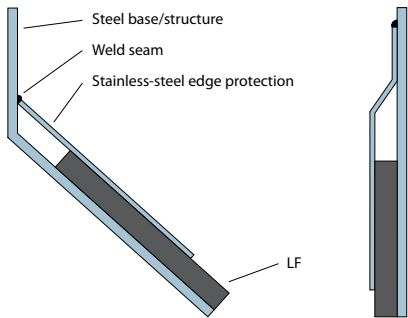


Calculate with 20 fixings/m².

Overlap/joint methods/ solutions. Made by cutting or milling.



For cutting joint/s as shown we recommend to use same tooling intended for wood.





General overview - Wear Lining Solutions

Metso Truck body lining solution.....	62
Lining solutions washing drum.....	64
Lining solutions concrete mixer.....	66
Lining solutions screens.....	68

Metso truck body lining solutions



Keep your trucks moving

It’s tough enough to squeeze maximum profitability out of a mining operation. Stopped trucks make it even tougher. The repeated impact and stress of loading and dumping heavy, abrasive material can cause expensive damage to the body and truck as a whole.

And your cost per tonne goes up with every unnecessary stop for service and maintenance. Metso Haul Truck solutions are comprehensive packages including truck body lining solution, pre-planning engineering, installation supervision and onsite inspections. They are designed with one thing in mind - to maximize the availability and productivity of your trucks, while reducing your costs for service and maintenance.



Metso Truck body lining out-toughs steel

Trellex rubber formulations, developed from years of on-site experience in the toughest mining conditions globally, offer up to 4x or more service life than steel. Metso Trellex wear rubber linings are optimized to absorb stress at every point in the truck work cycle, during loading, transport and dumping. Their low weight/high wear resistance design not only reduces damage to the truck body, but on the truck as a whole.

Lower costs, higher profits

Metso Truck body lining solution keeps your trucks moving—and thanks to the lower weight of rubber linings, keeps them moving more fuel-efficiently. With Metso Trellex wear rubber lining, panels can be replaced individually as needed rather than the entire lining, keeping profit-eating downtime for repairs and maintenance to a minimum.

Minimize noise to maximize productivity

Managing noise pollution is more important than ever, both for the health and safety of co-workers and to satisfy regional legislative demands. Metso Trellex wear rubber lining absorbs impact shock better than steel ever can, damping vibrations and noise by 10-15 decibels—the effect of cutting noise by half. You can even feel and hear the difference when sitting in the cab during loading.

Easy to work with

Metso Truck body lining solution is designed in a modular panel system. This not only makes them easier to handle than steel options, but saves on replacement time and costs as well. When a Metso Trellex wear rubber lining wears out, simply replace that panel instead of the whole lining.

	Wear rubber lining package	Installation package	Service life package	Life cycle package	Box repair and lining package
Wear rubber lining	●	●	●	●	●
Free engineering/pre-planning	●	●	●	●	●
Installation supervisor	●	●	●	●	●
3 year global product warranty	●	●	●	●	●
Annual free lining inspection and service report	● 1)	●	●	●	●
Complete installation incl. supervisor		●	●	●	●
Full service life warranty			●	●	
Life cycle service agreement (cost/tonne)				●	●
Refurbish steel box					2)

1) Not valid for construction packages
2) Available in selected markets

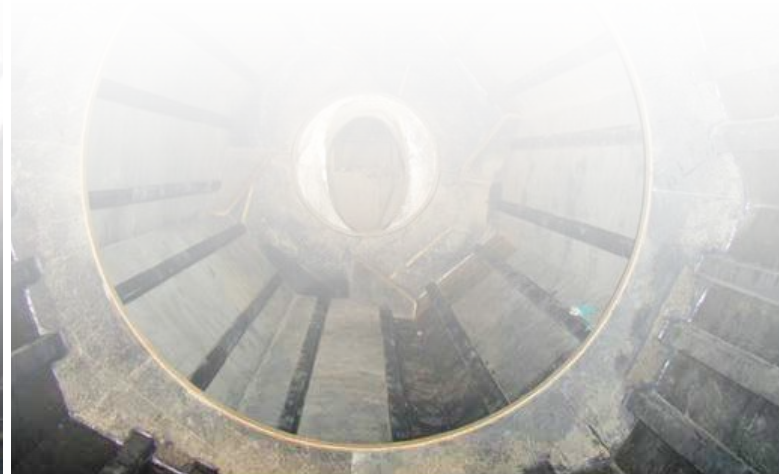
Lining solutions washing drum



Since the end of the 1970s, we have developed and produced linings for scrubber/washing drums and other applications in the aggregates and cement industry.

- Long service life and less maintenance keeps material flow up and downtime to a minimum
- Easy to handle
Trellex lightweight rubber material results in safe and easy handling during installation and prevents the risk of back injuries from heavy lifting
- Reduced noise level
Rubber is very effective absorbing noise and vibrations creating a better working environment. The noise can be reduced 10-15 dB(A) – the effect of cutting noise by half.

Please contact your local Metso representative for more information.



Lining solutions concrete mixer



Since the end of the 1960s, we have developed and produced linings for concrete mixers and other applications in the aggregates and cement industry. Today, we can offer complete lining systems including paddles and arm protection for both pan and drum mixers. Our range of linings covers most brands.

Trellex linings for concrete mixers

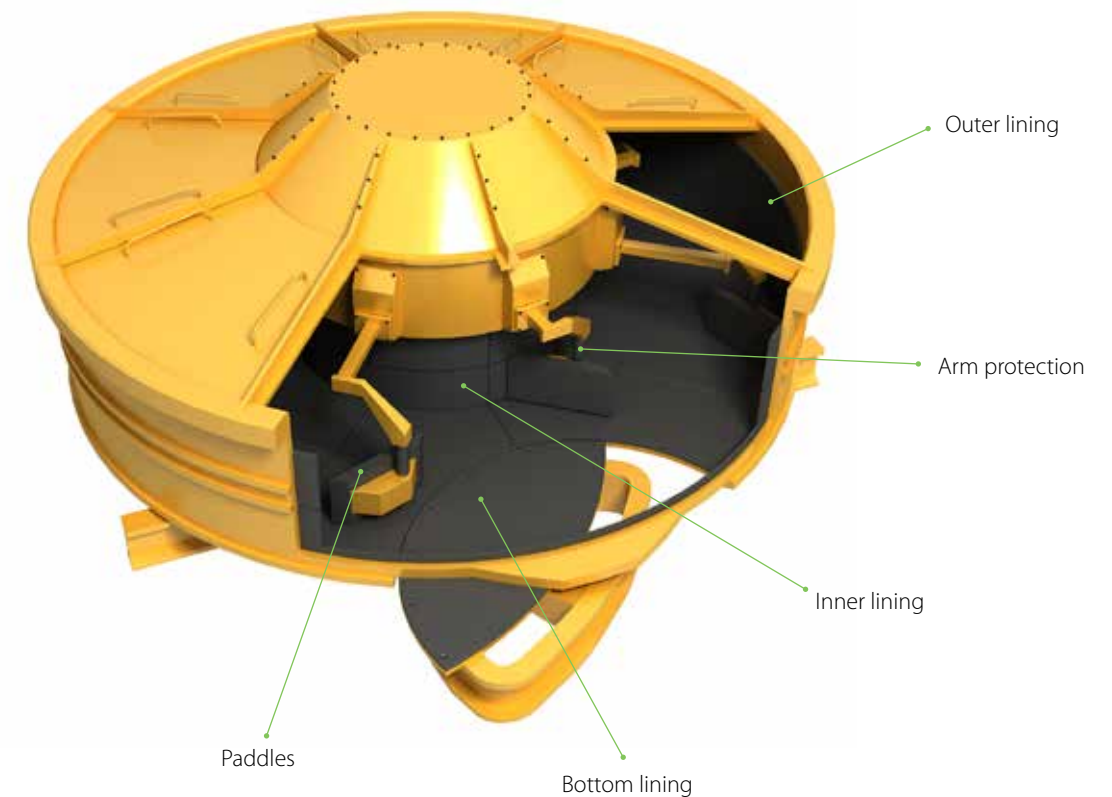
- Long service life and less maintenance keeps material flow up and downtime to a minimum
- Easy to handle
Trellex lightweight rubber material results in safe and easy handling during installation and prevents the risk of back injuries from heavy lifting
- Reduced noise level
Rubber is very effective absorbing noise and vibrations creating a better working environment. The noise can be reduced 10-15 dB(A) – the effect of cutting noise by half.

Trellex paddle system

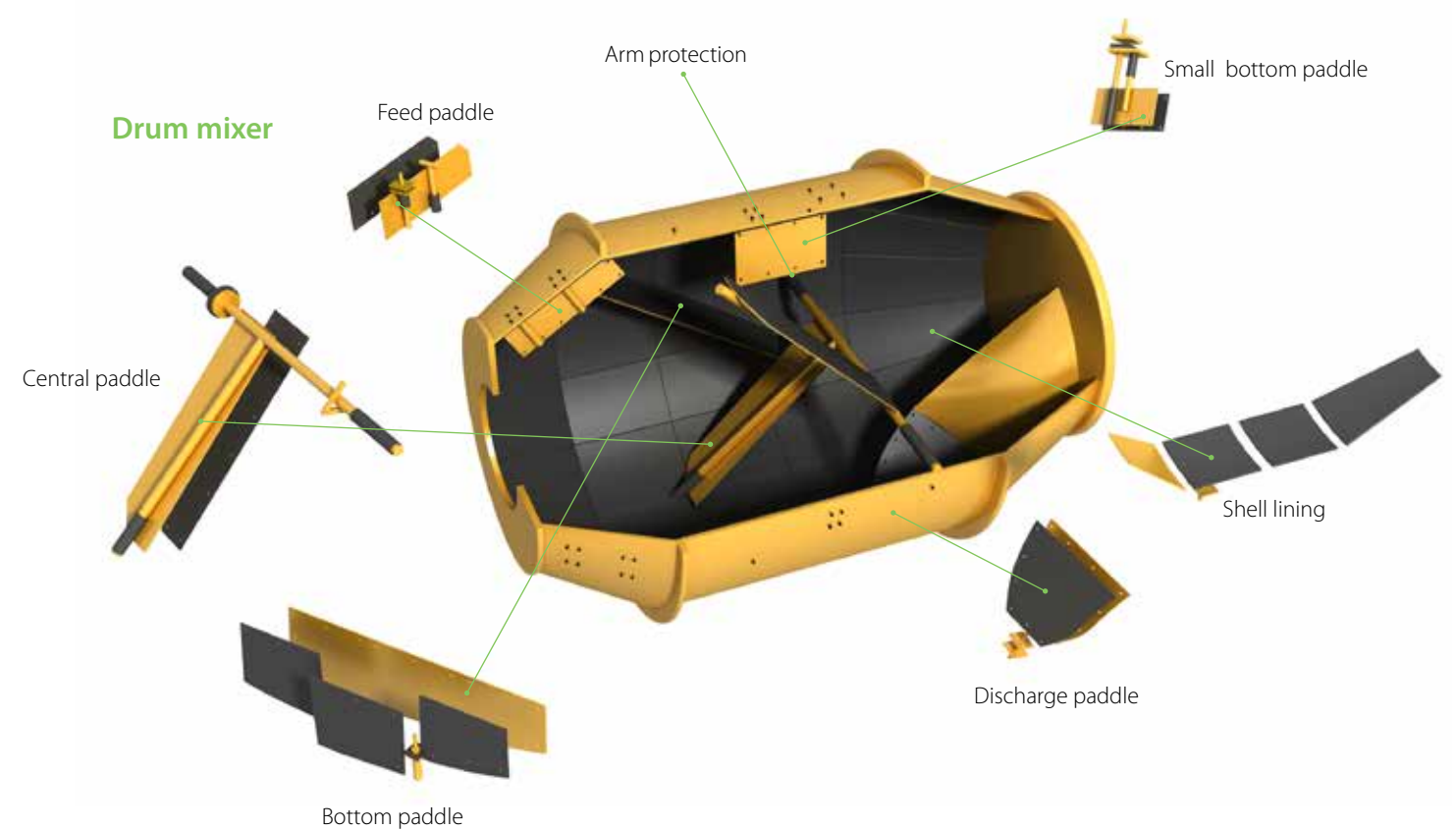
Trellex rubber and polyurethane paddles are specially designed and adapted for most brands of pan mixers. Trellex paddles can be used together with all type of linings. Apart from their long service life, the flexibility and elasticity of the paddles reduces wear and tear on the mixer lining—reducing costly downtime and getting the most out of your lining budget.



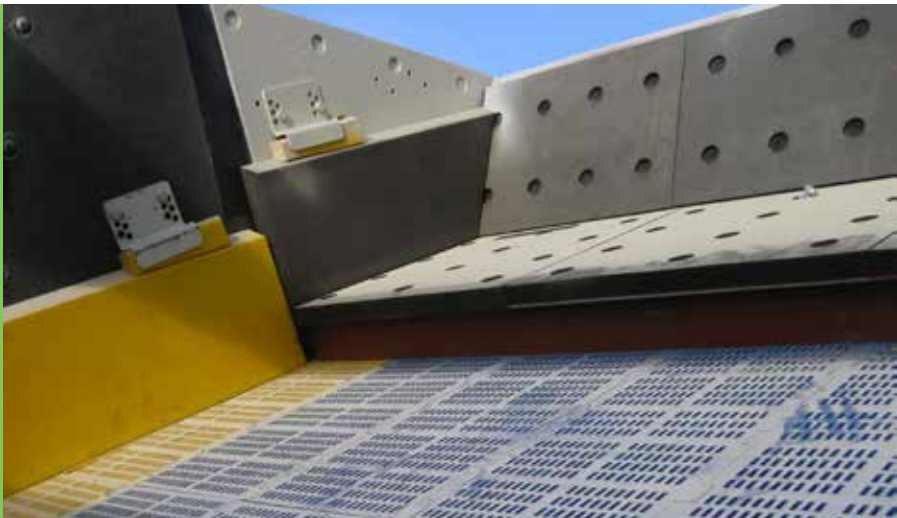
Pan mixer



Drum mixer



Lining solutions screens

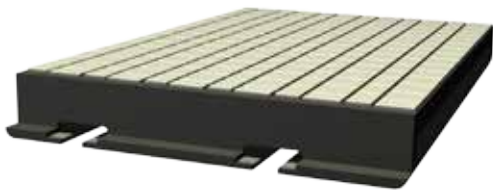


Feed box lining system

The screen feed box lining system includes a variety of options suitable for dry or wet screening applications. The system is based on either Trellex PP wear rubber system or Trellex Poly-Cer system or a combination of both. The system also offers a unique overlap sealing system to avoid material build- up between lining and screen. Available as a standard solution for Metso screens and tailor-made solution for other screen brands.



Trellex PP manufactured from T60 wear rubber and with hot-vulcanized steel reinforcement. Trellex PP delivers excellent wear resistance in applications with both impact and sliding wear.

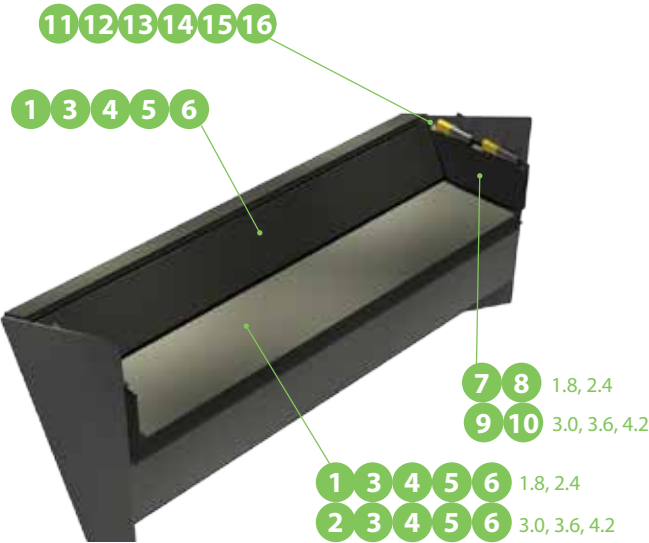


Trellex Poly-Cer is designed to be extremely resistant to abrasion even in high material flows and speeds. The unique design of ceramic inserts improves wear life and impact resistance. Trellex Poly-Cer is made of T60 wear rubber with built-in ceramics and enhanced with fixed hot-vulcanized steel reinforcement.

Mining screen feed box

Standard Trellex rubber

designed for Metso mining screens MF/LH/RF



Feed Box Lining - Metso MF, LH and RF screens

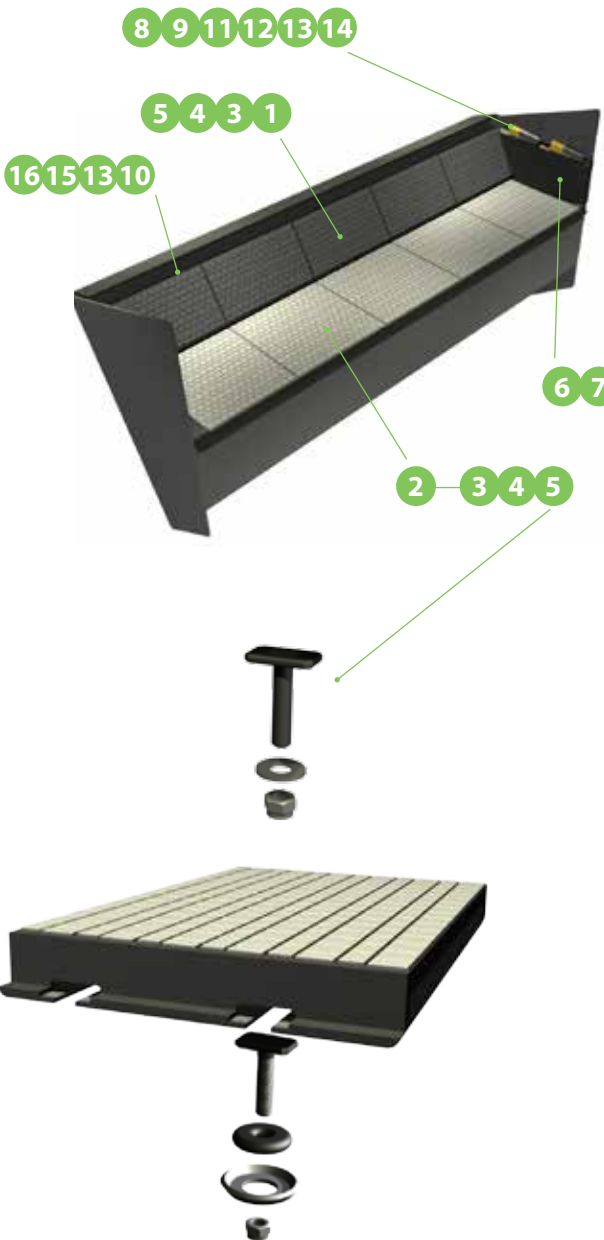
Item	Part No.	Part No. (OEM)*	Description	Weight (kg/ea)	Screen Width (m), Feed box length (mm) Quantities/screen machine				
					1.8 L=400	2.4 L=400	3.0 L=600	3.6 L=600	4.2 L=600
1	6620755	MM0602289	TRELLEX PP 40/5 400-625 E-T20/T60	19.00	6	8	5	6	7
2	6620783	MM0601501	TRELLEX PP 40/5 600-625 E T20/T60	24.00			5	6	7
3	315150	MM0250535	TRELLEX M16 NYLOC	0.04	36	48	60	72	84
4	292714	7001530310	BOLT, HEXAGONAL ISO4014-M16X40-8.8-A3F	0.09	36	48	60	72	84
5	T251600	N01633017	SM-ACC BRICKA NORDLOCK 16 D=17 D=25.4	0.01	36	48	60	72	84
6	ML-248025	ML-248025	ML-RUBBERPLUG 60/50-35	0.08	36	48	60	72	84
7	MM0364176	MM0614467	TRELLEX PP 50/5 300-598 A T60 RH	12.80	1	1			
8	MM0364178	MM0614471	TRELLEX PP 50/5 300-598 A T60 LH	12.80	1	1			
9	MM0358304	MM0614448	TRELLEX PP 50/5 300-770/587 R	18.30			1	1	1
10	MM0358306	MM0614443	TRELLEX PP 50/5 300-770/587 L	18.30			1	1	1
11	6681339	MM0609221	LS ACC-WEDGE-40-48-32-220-75/90-L	0.50	2	2	2	2	2
12	6681340	MM0608964	LS ACC-WEDGE-40-48-32-220-75/90-R	0.50	2	2	2	2	2
13	MM0364175	MM0610144	SM-ACC STEEL CLAMP FOR PU WEDGE - LH	1.20	2	2	2	2	2
14	MM0364174	MM0610140	SM-ACC STEEL CLAMP FOR PU WEDGE - RH	1.20	2	2	2	2	2
15	7001530190	7001530190	SCREW, HEXAGONAL ISO4017-M12X20-8.8-A3A	0.03	8	8	8	8	8
16	401810	704006970000	WASHER, PLAIN BRB 2x13/24	0.01	8	8	8	8	8

Back Plate Lining - Metso MF, LH and RF screens

Part No.	Part No. (OEM)*	Description	Weight (kg/ea)	Screen Width (m), Feed box length (mm) Quantities/screen machine				
				1.8 L=400	2.4 L=400	3.0 L=600	3.6 L=600	4.2 L=600
6620755	MM0602289	TRELLEX PP 40/5 400-625 E-T20/T60	19,00	3	4	5	6	7
315150	MM0250535	TRELLEX M16 NYLOC	0,04	18	24	30	36	42
292714	7001530310	BOLT, HEXAGONAL ISO4014-M16X40-8.8-A3F	0,09	18	24	30	36	42
T251600	N01633017	SM-ACC BRICKA NORDLOCK 16 D=17 D=25,4	0,01	18	24	30	36	42
ML-248025	ML-248025	ML-RUBBERPLUG 60/50-35	0,08	18	24	30	36	42

Mining screen feed box

Standard Trellex Poly-Cer
designed for Metso mining screens MF/LH/RH



Item	Part No.	Description	Screen 1.8 Qty	Screen 2.4 Qty	Weigth Kg/ea
1	MM0363260	Trellex Poly-Cer 64/5 618-450	3	4	49.3
2	MM0363288	Trellex Poly-Cer 64/5 618-400	3	4	46.5
3	2934210	Trellex T-bolt TF 35/55 M16x70/55	24	32	0.22
4	MM0393220	Washer 3x17/50	24	32	0.04
5	315150	Nut nyloc M16	24	32	0.035
6	MM0363350	Trellex PP 50/5 300-585 LH	1	1	12.4
7	MM0363351	Trellex PP 50/5 300-585 RH	1	1	12.4
8	6681339	Wedge PU LH	2	2	0.5
9	6681340	Wedge PU RH	2	2	0.5
10	MM0363322	Trellex PP 15/3 620-200	3	4	4
11	MM0364175	Steel clamp for PU-wedge LH	2	2	1.15
12	MM0364174	Steel clamp for PU-wedge RH	2	2	1.15
13	401810	Washer 2x13/24	20	24	0.005
14	7001530190	Bolt M12x20	8	8	0.03
15	2028000	Bolt M12x40	6	8	0.044
16	294215	Nut nyloc M12	6	8	0.018
Screen 1.8	MM0363951	One SET item 1-16	338 Kg		
Screen 2.4	MM0363954	One SET item 1-16	440 Kg		

			Screen 3.0 Qty	Screen 3.6 Qty	Screen 4.2 Qty	Weight Kg/ea
1	MM0363307	Trellex Poly-Cer 64/5 623-380	5	6	7	42.2
2	MM0363309	Trellex Poly-Cer 64/5 623-600	5	6	7	68
3	2934210	Trellex T-bolt TF 35/55 M16x70/55	40	48	56	0.22
4	MM0393220	Washer 3x17/50	40	48	56	0.04
5	315150	Nut nyloc M16	40	48	56	0.035
6	MM0363304	Trellex PP 50/5 300-757 LH	1	1	1	17.2
7	MM0363305	Trellex PP 50/5 300-757 RH	1	1	1	17.2
8	6681339	Wedge PU LH	2	2	2	0.5
9	6681340	Wedge PU RH	2	2	2	0.5
10	MM0363322	Trellex PP 15/3 620-200	5	6	7	4
11	MM0364175	Steel clamp for PU-wedge LH	2	2	2	1.15
12	MM0364174	Steel clamp for PU-wedge RH	2	2	2	1.15
13	401810	Washer 2x13/24	28	32	36	0.005
14	7001530190	Bolt M12x20	8	8	8	0.03
15	2028000	Bolt M12x40	10	12	14	0.044
16	294215	Nut nyloc M12	10	12	14	0.018
Screen 3.0	MM0363955	One SET item 1-16	624 Kg			
Screen 3.6	MM0363956	One SET item 1-16	740 Kg			
Screen 4.2	MM0363957	One SET item 1-16	857 Kg			

Fixing alternative for wet conditions

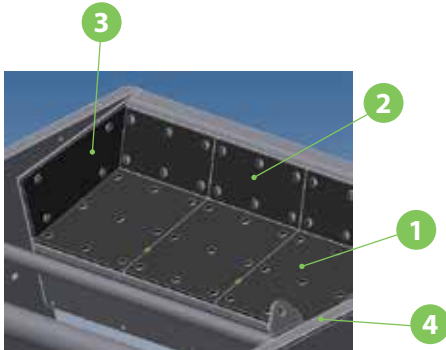
Part No.	Description
MM0369039	Trellex T-bolt M16 package for wet-screening including T-bolt, rubber sealing, cup washer and nut M16 nylock

Construction screens

Standard Trellex rubber
designed for Metso construction screens ES and CVB

Feed box lining

CVB & ES (Quantities/screen)								
Item	Part No.	Description	Weight (kg/ea)	10X	20X	30X	40X	50X
1	MM0412310	TRELLEX PP 30/5 305-200 T16/T60	2.60	5				
2	MM0412305	TRELLEX PP 30/5 305-500 T16/T60	8.90	5				
3	MM0412395	TRELLEX PP 30/5 222-575 A-T16/T60	6.30	1				
4	MM0412373	TRELLEX PP 30/5 222-575 A-T16/T60	6.30	1				
1	MM0398574	TRELLEX LSS PP 25/3 612-626 A-T16/T60	16.90		3	3	4	4
2	MM0398606	TRELLEX LSS PP 25/3 315-612 A-T16/T60	8.00		3	3	4	4
3	MM0398615	TRELLEX LSS PP 25/3 338-737 A-T16/T60	9.10		1	1	1	1
4	MM0398609	TRELLEX LSS PP 25/3 338-737 A-T16/T60	9.10		1	1	1	1



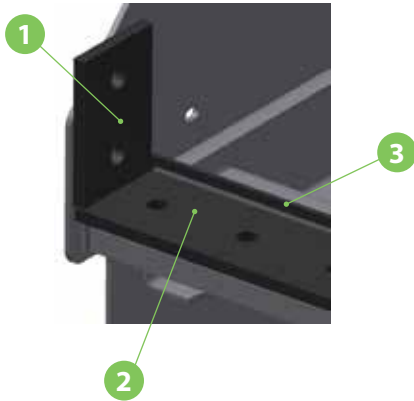
Cardan shaft protection

Item	Part No.	Description	Weight (kg/ea)	Used in the following models
1	MM0413169	TRELLEX LSS PP 20/4 911-424-T16-T60	18.50	CVB10X
2	MM0407356	TRELLEX LSS PP 20/4 1090-424-T16-T60	22.20	CVB304
3	MM0400953	TRELLEX LSS PP 20/4 1196-424-T16-T60	24.40	ES202, ES203, ES302, ES303, CVB303
4	MM0400951	TRELLEX LSS PP 20/4 1700-424-T16-T60	34.90	CVB403, CVB502, ES402, ES403
5	MM0400954	TRELLEX LSS PP 20/4 1806-424-T16-T60	37.10	CVB402, CVB503

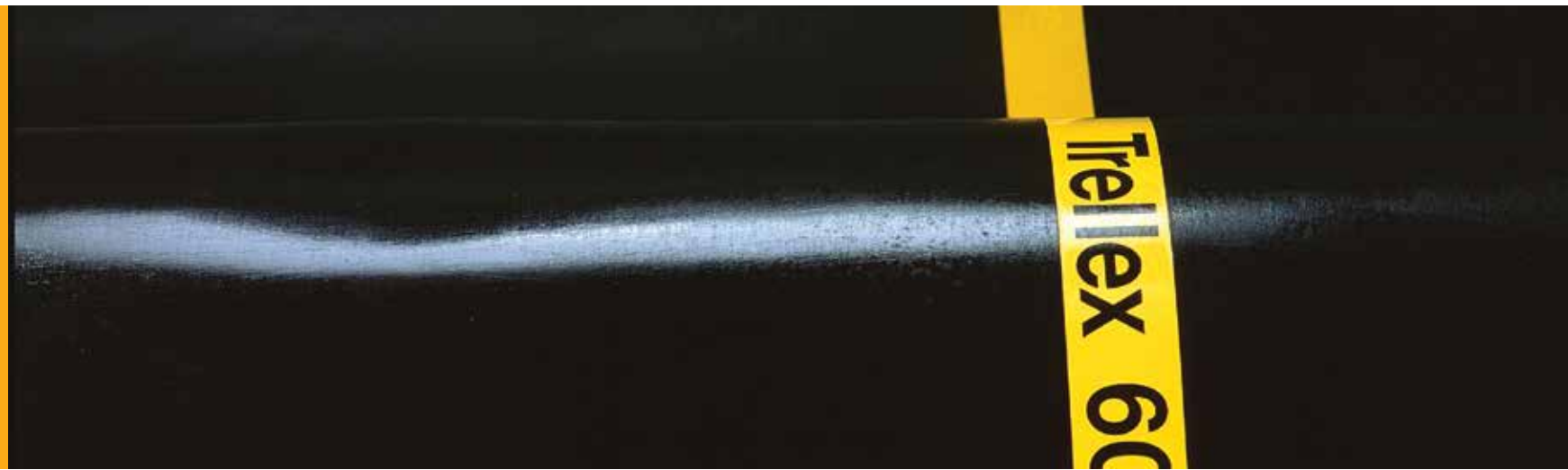


Discharge lip area

CVB & ES (Quantities/screen)								
Item	Part No.	Description	Weight (kg/ea)	10X	20X	30X	40X	50X
1	MM0400109	TRELLEX LSS PP 25/3-290-195-T16/T60	2.30	2	2	2	2	2
2	MM0400110	TRELLEX LSS PP 25/3-612-200-T16/T60	5.10		3	3	4	4
3	MM0400571	TRELLEX LSS PP 10/5-170-612-T16/T60	2.60		3	3	4	4
2	MM0413296	TRELLEX LSS PP 25/3-1530-200-T16/T60	17.80	1				
3	MM0413334	TRELLEX LSS PP 10/5-170-1530-T16/T60	13.60	1				



Trellex Wear Resistant Sheeting



Reduces risk of breakdown

Installing Trellex wear resistant sheeting from Metso is identical with good operating economy and reduced risk of breakdowns. Since the early 1960's, Metso has gained considerable, worldwide experience not only in the applications of such, but also in how to consistently produce high quality products.

Increases your uptime

Trellex wear sheeting has proved a long wear life in comparison with other wear materials like steel. The result is that you simply don't need to change lining as often. Fewer stops and less production losses increase your profitability. Depending on application you can choose from rubber or polyurethane wear sheeting.

Caring for working environment

Improving the working environment is more important than ever, both for the health and safety of co-workers and to satisfy regional legislative demands. Hearing damage is one of the biggest problems experienced by the workers. Trellex wear rubber sheeting from Metso generates less noise than traditional steel lining and therefore contributes significantly to reduce this problem. Additionally Trellex wear resistant rubber is lighter in weight compared to steel, making it easier to handle in most applications. This means a reduced risk of injuries associated with carrying heavy loads.

Applications

If you have fine material in wet applications or when you need a more oil and ozone resistant material than rubber, we recommend wear sheeting made of polyurethane.

Trellex PU Sheeting

- PU wear resistance for small and sliding particles
- Excellent oil and solvent resistance
- Thickness
- 5-30 mm
- Width x Length
- 1000 x 2000 mm



Trellex RU Sheeting - T40

- High quality black NR rubber, used for sliding abrasion of small particles
- Also available with CL and TO layer
- 5 and 10 meter rolls (width 1400 mm)



Trellex RU Sheeting - T60

- High quality black SBR rubber, used for large sized particles
- Excellent for wear, tear and impacting applications
- Also available with CL and TO layer
- Available with profiled design 5 and 10 meter rolls (width 1400 mm)



Trellex RU Sheeting - TR60

- Wear rubber for applications where good wear resistance is required
- A price-worthy choice – when softer rocks and smaller impact forces are involved
- Also available with CL layer
- 5 and 10 meter rolls (width 1400 mm)



Trellex Wear resistant sheeting

Trellex RU Sheeting - T40



Trellex T40 smooth
Sheeting intended mainly for sliding and blasting abrasion and for small particle sizes. Extremely high wear resistans against fine-grained, slurried materials. Tolerates operating temperatures of 60 – 70°C. Withstands low concentrations of oil (splashing, etc.). Limited resistance to crushing, piercing and tearing.

T40 CL (Contact Layer)
Same type of rubber as in T40 Smooth. One side is coated with a special contact layer, which eliminates the need for buffing and primer treatment. A single application of adhesive is sufficient. Furthermore, installation is simpler and faster.

T40 TO (Tear Off)
Same type of rubber as in T40 Smooth. One side with a tear-off fabric backing. Removing the fabric backing exposes a roughened surface free from impurities and suitable for immediate bonding without first needing to be buffed making the installation easier and faster.



Technichal information

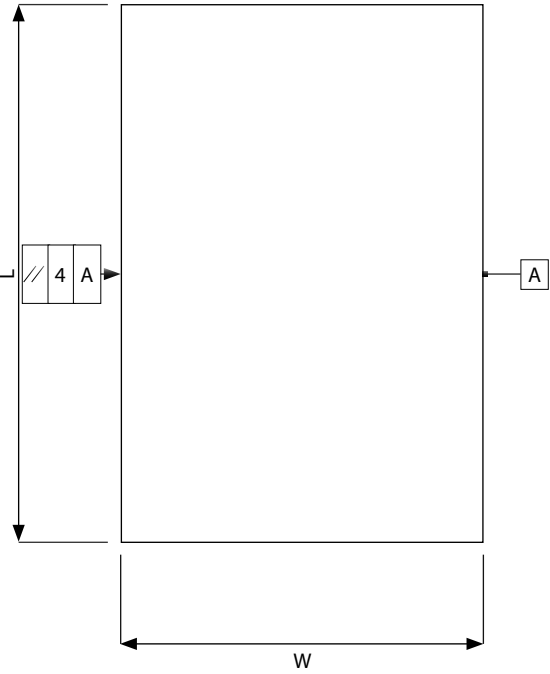
Colour	Density	Hardness
Black	1.0 Mg/m³	40 ± 5° IRH

Property	Typical values	Tolerance	Unit	Test method
Hardness	40	40 ±5	°IRHD	ISO 48
Density	1.0	1.0±0.03	g/cm³	ISO 2781
Tensile strength	18	16 MIN	MPa	ISO 37
Elongation at break	600	575 MIN	%	ISO 37
Tear resistance ISO 34 C	24	21 MIN	kN/m	ISO 34

Nom. thickness (mm)	Approx. width (mm)	Approx. length (mm)	Nom. weight (kg/m²)	kg/roll	Available in TO and CL
4	1400	10000	4.0	56.0	yes
4	1400	50000	4.0	280.0	no
5	1400	10000	5.0	70.0	yes
6	1400	10000	6.0	84.0	yes
6	1400	50000	6.0	420.0	no
8	1400	6000	8.0	67.2	yes
10	1400	6000	10.0	84.0	yes
12	1500	3000	12.0	54.0	no
15	1500	3000	15.0	67.5	no
20	1500	3000	20.0	90.0	no
25	1500	3000	25.0	112.5	no

Dimensions for all rubber sheeting

Rubber Sheeting	Nom. Measures (mm)	Tolerance ± (mm)
Thickness	0 – 6.0	0.4
(ISO 3302 class M3)	6.1 - 10.0	0.5
	10.1 - 15.0	0.6
	15.1 - 18.0	0.8
	18.1 - 40.0	1.0
	40.1 – 50.0	1.3
Width	All sizes	-10 / +25
Length	All sizes	-0 / +500



Trellex Wear resistant sheeting

Trellex RU Sheeting - T60



Trellex T60 smooth

A rubber grade satisfying extremely high requirements of wear and tear and of impacting. Outstanding when the abrasive material contains large particle sizes. Has extremely good tensile strength and tear resistance. Tolerates operating temperatures of 70 – 80°C. Withstands moderate concentrations of chemicals and oils.

T60 CL (Contact Layer)

Same type of rubber as in T60 Smooth. One side is coated with a special contact layer which eliminates the need for buffing and primer treatment. A single application of adhesive is sufficient. Furthermore, installation is simpler and faster.

T60 TO (Tear-Off)

Same type of rubber as in T60 Smooth. One side with a tear-off fabric backing. Removing the fabric backing exposes a roughened surface free from impurities and suitable for immediate bonding without first needing to be buffed.



Technichal information

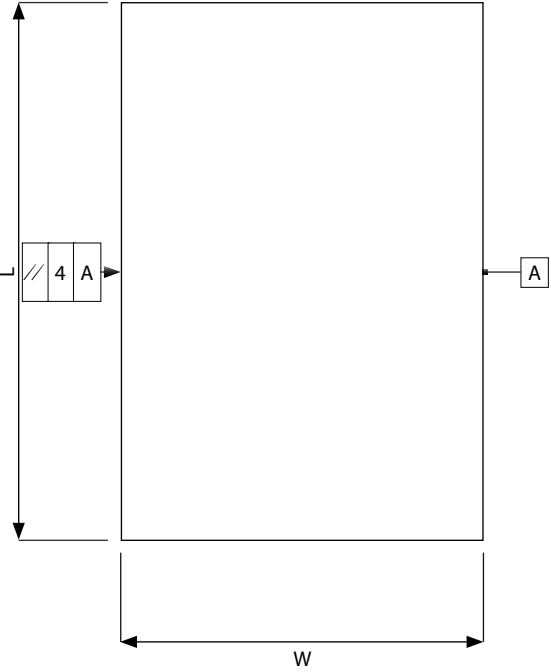
Colour	Density	Hardness
Black	1.103 Mg/m³	60 ± 5° IRH

Property	Typical values	Tolerance	Unit	Test method
Hardness	60	60 ±5	°IRHD	ISO 48
Density	1.13	1.13 ±0.03	g/cm³	ISO 2781
Tensile strength	19.5	17 MIN	MPa	ISO 37
Elongation at break	510	450 MIN	%	ISO 37
Tear resistance ISO 34 C	30	27 MIN	kN/m	ISO 34

Nom. thickness (mm)	Approx. width (mm)	Approx. length (mm)	Nom. weight (kg/m²)	kg/roll	Available in TO and CL
4	1400	10000	4.0	56.0	yes
4	1400	50000	4.0	280.0	no
5	1400	10000	5.0	70.0	yes
6	1400	10000	6.0	84.0	yes
6	1400	50000	6.0	420.0	no
8	1400	6000	8.0	67.2	yes
10	1400	6000	10.0	84.0	yes
12	1500	3000	12.0	54.0	no
15	1500	3000	15.0	67.5	no
20	1500	3000	20.0	90.0	no
25	1500	3000	25.0	112.5	no

Dimensions for all rubber sheeting

Rubber Sheeting	Nom. Measures (mm)	Tolerance ± (mm)
Thickness	0 – 6.0	0.4
(ISO 3302 class M3)	6.1 - 10.0	0.5
	10.1 - 15.0	0.6
	15.1 - 18.0	0.8
	18.1 - 40.0	1.0
	40.1 – 50.0	1.3
Width	All sizes	-10 / +25
Length	All sizes	-0 / +500



Trellex Wear resistant sheeting

Trellex RU Sheeting - TR60



TR60

Wear-resistant rubber sheeting for applications where good wear resistance is required. Moderate tensile strength and tear resistance. Genuine allround sheeting which can be used for the most diverse applications.



Technichal information

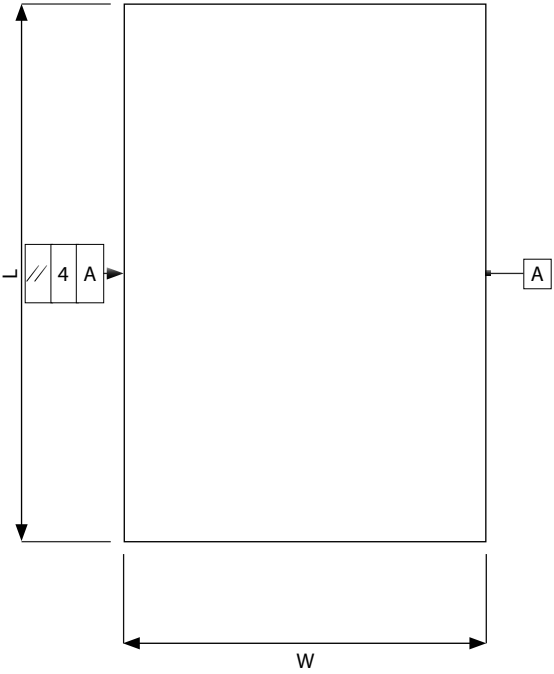
Colour	Density	Hardness
Black	1.25 Mg/m³	60 ± 5° IRH

Property	Typical values	Tolerance	Unit	Test method
Hardness	60	60 ±5	°IRHD	ISO 48
Density	1.25	1.25 ±0.05	g/cm³	ISO 2781
Tensile strength	12	10 MIN	MPa	ISO 37
Elongation at break	450	390 MIN	%	ISO 37
Tear resistance ISO 34 C	23	20 MIN	kN/m	ISO 34

Nom. thickness (mm)	Approx. width (mm)	Approx. length (mm)	Nom. weight (kg/m²)	kg/roll	Available in CL
6	1400	10000	7.5	105.0	
8	1400	10000	10.0	140.0	
10	1400	6000	12.5	105.0	
12	1400	5000	15.0	105.0	
15	1400	5000	18.75	131.0	
20	1400	5000	25.0	175.0	
25	1400	5000	32.0	224.0	

Dimensions for all rubber sheeting

Rubber Sheeting	Nom. Measures (mm)	Tolerance ± (mm)
Thickness	0 – 6.0	0.4
(ISO 3302 class M3)	6.1 - 10.0	0.5
	10.1 - 15.0	0.6
	15.1 - 18.0	0.8
	18.1 - 40.0	1.0
	40.1 – 50.0	1.3
Width	All sizes	-10 / +25
Length	All sizes	-0 / +500





Trellex Wear resistant sheeting

Trellex PU Sheeting

Wear Resistant Polyurethane sheeting PU

PU is a plain Polyurethane sheeting without fabric or steel reinforcement. It can be fastened in several ways in different types of applications. It provides good abrasion resistance, to fine and medium sized particles. The PU wear resistant sheeting normally has good resistance to oil and very good ozone resistance. Excellent wear resistance especially in wet applications. They are all available in the same sizes but different hardness, 70° - 80° - and 90° IRH. The lining can be tailor-made for each application out of standard sheets.

Nom. thickness (mm)	Approx. width (mm)	Approx. length (mm)	Shore A 70° Blue	Shore A 80° Yellow	Shore A 90° Green
5	1000	2000	X	X	X
10	1000	2000	X	X	X
15	1000	2000	X	X	X
20	1000	2000	X	X	X
25	1000	2000	X	X	X
30	1000	2000	X	X	X

Technical information

Property	PU		
	70	80	90
Hardness, °IRH	70 ± 5	80 ± 5	90 ± 5
Tensile strength, MPa	Min 30	Min 35	Min 35
Elongation at break, %	Min 400	Min 400	Min 350
Tear resistance ISO 34C, kN/m	Min 30	Min 40	Min 55
Density, Mg/m ³	1.19 ± 0.02	1.20 ± 0.02	1.21 ± 0.02
Colour	Blue	Yellow	Green



Good operating economy and reduced risk of breakdowns

Notes

Notes

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